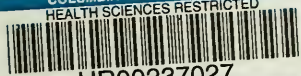


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THIRTY-FIFTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1907.



BY AUTHORITY

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OFFICE OF THE  
SECRETARY OF THE STATE BOARD OF HEALTH,  
LANSING, MICHIGAN, DECEMBER, 1907.

TO HON. FRED M. WARNER, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying report for the fiscal year ending June 30, 1907.

Very respectfully,

FRANK W. SHUMWAY,

*Secretary of the State Board of Health.*





MEMBERS  
OF THE  
MICHIGAN STATE BOARD OF HEALTH.

---

NAME.	POSTOFFICE ADDRESS.	TERM EXPIRES.
CHARLES M. RANGER, A. B. ....	Battle Creek....	January 31, 1909.
HON. COLEMAN C. VAUGHAN .....	St. Johns....	January 31, 1909.
ANGUS McLEAN, M. D.....	Detroit....	January 31, 1911.
MALCOLM C. SINCLAIR, M. D.....	Grand Rapids....	January 31, 1911.
FRANK W. SHUMWAY, M. D.....	Lansing.....	March 30, 1911.
VICTOR C. VAUGHAN, M. D., Ph. D.....	Ann Arbor....	January 31, 1913.
AARON R. WHEELER, M. D.....	St. Louis....	January 31, 1913.

---

PRESIDENT.

ANGUS McLEAN, M. D.

VICE-PRESIDENT.

MALCOLM C. SINCLAIR, M. D.

SECRETARY AND EXECUTIVE OFFICER.

FRANK W. SHUMWAY, M. D.



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#### ERRATUM.

By an oversight, the summary on tuberculosis in public and private institutions in Michigan, referred to in paragraph three, page 16, was omitted from the article on "Tuberculosis in Michigan in 1906 and preceding years," but is printed in the Appendix at the close of this report.



## PART I.

### REGULAR AND SPECIAL MEETINGS OF THE STATE BOARD OF HEALTH, FISCAL YEAR, 1907.

#### BRIEF EXTRACTS FROM THE PROCEEDINGS.

##### REGULAR MEETING, HELD AT LANSING, JULY 25, 1906.

The members present were: Charles M. Ranger, A. B., Battle Creek, Angus McLean, M. D., Detroit, Aaron R. Wheeler, M. D., St. Louis, Hon. Coleman C. Vaughan, St. Johns, and Frank W. Shumway, M. D., Secretary.

The time of the meeting was taken up, principally, in the consideration of questions affecting the examination of embalmers, reciprocity between Michigan and other States which provide for the examination and licensing of embalmers, etc.

##### REGULAR MEETING, HELD AT LANSING, OCTOBER 12, 1906.

The members present were: Vice-President Angus McLean, M. D., Detroit, Charles M. Ranger, A. B., Battle Creek, Malcolm C. Sinclair, M. D., Grand Rapids, Aaron R. Wheeler, M. D., St. Louis, and Frank W. Shumway, M. D., Secretary.

Mr. Ranger, as member of the Committee in attendance at the Conference of Embalmers' Examining Boards with the State Boards of Health, at Chicago, September 2, 1906, reported verbally upon the meeting in substance as follows:

Thirty States were represented at the meeting, being eight more than ever before represented at these meetings.

The two subjects that were prominent at the meeting were the enforcement of the law and reciprocity.

It was brought out that, by reason of the privacy of the work of the undertaker, all of the States had experienced the same difficulty in regard to the enforcement of the law that had been met with in Michigan.

In the matter of reciprocity, the Conference recommended to the several boards that the plan talked over by this Board at its last meeting be adopted. That is, in case a person holding a license in one State desires to practice embalming in another State, he shall file with the Secretary of the Board in the State where he desires to practice a certified copy of the examination paper on which he received his license in his own State, and secure from the Secretary of the Board of his own State a certificate to the effect that he is in good standing in his own State. He shall then be granted a reciprocal license.

The Conference was organized into a regular body by the adoption of a constitution, and Dr. Shumway was made Chairman of the Committee on Organization.

It was recommended that the meeting of the Conference be held with the National meeting of the Boards of Health and Marine-Hospital Service.

Mr. Ranger suggested that the Board adopt the recommendations of the Conference in regard to the question of reciprocal license, and this was done.

The matter of establishing a bacteriological department in connection with this State Board of Health was considered and the following resolution was unanimously adopted:

*“Resolved, That it is the sense of the State Board of Health that the interests of the people of the State at large, in relation to the health of the people, would best be conserved by having in connection with the State Board of Health, at Lansing, a bacteriological and chemical laboratory, as well as a bacteriologist competent to make such examinations, both microscopical and chemical, as may be necessary in order to determine the cause of epidemics of whatever nature, that may be prevalent at any point within the State, and that the State legislature be asked at its next session to make a suitable appropriation for such purpose.”*

Doctors McLean, Sinclair and Shumway were appointed a committee to consider and take action upon the proposed legislation.

After some discussion relative to the enforcement of the law governing the practice of embalming, Mr. Ranger offered the following letter with the recommendation that a copy of the same be sent to every licensed embalmer in Michigan:

“To the Licensed Embalmers of Michigan:

“Gentlemen—The enforcement of the embalmers’ license law has proven a very difficult matter for this Board to handle. Because of the privacy in which much of the work of an undertaker is done, in preparing a body for burial, it is very difficult to secure definite evidence of violations of the law. The cooperation of the licensed embalmers is an important factor to us and we solicit your interest and assistance in carrying out the provisions of the law. If a body is received by you for burial from train or any other public carrier, the shipping papers will show by whom the body was prepared. You can determine from your printed list of licensed embalmers whether the body was prepared by an unlicensed undertaker or not. If it was done by such undertaker and you can find on examination that the body has been embalmed, we wish you would report the matter to your health officer and with him provide witnesses as to the work done on the body. Such a case will provide us with a definite proof of the violation of the law and we will give the matter our best attention.

“In case an undertaker in your vicinity is doing business without a license and is probably doing the work of embalming unlawfully, the case is more difficult to trace up. It will be necessary to show in court that he did arterial or cavity work on a given body on a given date. If such proof can be secured, the legal course to be taken is to enter a complaint against the offender before the Prosecuting Attorney of the county in which the violation of the law occurred. This Board is ready at any time to enter such a complaint; and will, upon the submission of sufficient evidence, prosecute any violation of the embalmers’ law.”

REGULAR MEETING, HELD AT LANSING, JANUARY 11, 1907.

The members present were: Vice-President Angus McLean, M. D., Detroit, Malcolm C. Sinclair, M. D., Grand Rapids, Aaron R. Wheeler, M. D., St. Louis, and Frank W. Shumway, M. D., Secretary.



After some discussion relative to the merits of the several brands of solidified formaldehyde upon the market, the Secretary offered the following resolution which was adopted:

"Inasmuch as the preparation, Formaldehyde product manufactured by the De Pree Chemical Company, of Holland, Michigan, has been endorsed as an efficient disinfectant by two bacteriologists, both personally and professionally known to this Board as reliable and expert judges of the efficiency of disinfectants, Be it therefore Resolved, That the State Board of Health of Michigan recognize the use of this product when used in accordance with the instructions accompanying the disinfectant, as an efficient disinfectant."

The Secretary read a letter submitting resolutions adopted at the General Conference of Health Officers in 1905, whereby examination of children's eyes and ears in the public schools should be made, and these resolutions were concurred in by the Board.

The question of proposed public health legislation was taken up and quite fully discussed, particularly along the lines of a revision of the public health laws; the regulation of the public water supplies; a revision of the embalmers' law; and the establishment of a State Laboratory in connection with the State Board of Health. It seemed to be the sentiment of the members present that legislation along these lines was necessary and urgent.

#### REGULAR MEETING, HELD AT LANSING, APRIL 12, 1907.

The members present were: Aaron R. Wheeler, M. D., St. Louis, Malcolm C. Sinclair, M. D., Grand Rapids, Charles M. Ranger, A. B., Battle Creek, and Frank W. Shumway, M. D., Secretary.

This being the annual meeting for the election of President, Dr. McLean was elected to that office by unanimous vote.

The question of a vice-president was taken up and Dr. Sinclair was elected to that office.

The question of the preparation of an exhibit for the International Congress on Tuberculosis, at Washington, D. C., September 21 to October 12, 1908, was taken up and it was decided, by motion, that this Board prepare an exhibit, and that Doctors McLean, Shumway, Vaughan, Wheeler and Sinclair constitute a committee to formulate plans for the exhibit and how it shall be conducted. This Committee was authorized to ask the legislature for an appropriation sufficient to carry out this exhibit.

Relative to the proposed public health legislation, considered at the previous regular meeting of the Board, it was unanimously decided to ask the legislature to amend the law under which the Board requires reports of dangerous communicable diseases, in Act 137, to read as follows: "Smallpox, chicken-pox, diphtheria, scarlet fever, typhoid fever, meningitis, whooping-cough, measles, tuberculosis, pneumonia, and such other diseases as the State Board of Health shall from time to time determine to be dangerous to the public health."

The practicability of requiring in all cases hermetically sealed caskets, as stated in Rule 8 of the Rules and Regulations of the Michigan State Board of Health governing the preparation of dead bodies for transportation, was discussed by the Board, and, because of the point brought

out by Mr. Ranger that there is no surety that the body is free from germs after ten years, the requirement was left as stated in Rule 8.

The question of Instruction in Embalming in the University of Michigan was discussed, and the Secretary of this Board was appointed a committee to take up the question and report later.

The report of the Sanitary Engineer of this Department on the plans for a proposed addition to the Western State Normal School, at Kalamazoo, was read and the plans were approved subject to certain changes being made in them, as recommended.

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### EXAMINATION OF PLANS FOR STATE BUILDINGS, RELATIVE TO SEWERAGE, VENTILATION AND HEATING, DURING THE FISCAL YEAR ENDING JUNE 30, 1907.

The following are reports upon the examinations of the plans submitted to the Board during the fiscal year, in accordance with Section 2229, Compiled Laws of 1897:

#### A PROPOSED NEW MECHANICAL BUILDING AT THE MICHIGAN AGRICULTURAL COLLEGE.

In accordance with Section 2229, Compiled Laws of 1897, plans for a proposed new Mechanical Building, at the Michigan Agricultural College, have been examined by the State Board of Health.

The details of the heating and plumbing not being shown on the plans, upon request, Prof. Weil and Mr. Newell, of the Michigan Agricultural College, called at the office of the Secretary of this Board and made explanations relative to the heating and ventilation, at the same time submitting an amended plan of the basement which showed, in red pencil, proposed radical changes in the arrangement of the sewers and drains. A blue print of this amended plan was later furnished this Department to take the place of the one originally submitted for examination, but not until a considerable portion of the work had been done in the construction of the sewers and drains.

The explanations made by Prof. Weil, relative to the heating and ventilation, were, upon request, subsequently incorporated in a letter from him, as follows:

"We propose to employ in the new engineering building a combined system of heating and ventilation, using direct radiation in most rooms of sufficient quantity to maintain a minimum temperature of, say, nearly 60 degrees Fahr. during zero weather and 70 degrees Fahr. under ordinary conditions—providing in offices that are likely to be used in the evening sufficient direct radiation for heating same to 70 degrees Fahr. in zero weather—and employing a fan and heating coils for furnishing air at about 75 degrees Fahr. for the purpose of ventilation. A system of automatic control will be employed in connection with the radiators and the heating coil behind the fan. The flues and the fan will be designed to furnish eighteen hundred (1,800) cubic feet of air per individual, per hour. I would add that the number likely to be occupying a class room or drawing room at one time will generally be about twenty-five (25) but, in the

case of the larger rooms, provision has been made for furnishing air for as many as seventy (70) students."

The plans show the fresh-air supply to be from outside the building, and the duct conveying the fresh air from the fan to the several flues to be underground. It was pointed out to Prof. Weil that the proposed location of the fresh-air duct (or tunnel) underground might be objectionable on account of dampness, and he stated that the tunnel would be made watertight.

The vent flues are planned to terminate in the attic, in groups, and be connected with seventeen ventilators on the roof.

A memoranda, which accompanied the amended plan of the basement, provides that all the plumbing work is to be carried out with good materials and in accordance with modern methods of sanitation.

Beyond what surface water might pass into the drains through openings in the basement floor, the plans do not show any provision for maintaining the seals of three traps on the main drains which, during a dry season, might become so reduced as to allow sewer air to pass into the drains and be discharged, through rain conductors, in close proximity to skylights which may be open, and, through floor traps, which would possibly be dry, into the basement rooms. Upon a second visit to the office of the Secretary of this Board, Mr. Newell stated that the waste pipe from the drinking fountains would discharge into one of the rain conductors. As this would affect but one out of three of the main traps, it is recommended that the rain conductors and floor drains discharge into a storm drain and not into a sewer, but, if this is not practicable, that provision be made for maintaining the seals of all the traps at all times, and rendering the passage of sewer air into the drains absolutely impossible.

The specifications state that the soil pipes will be carried four feet above the roof, and the plans show that some of them will discharge air in close proximity to skylights which may be open. It is recommended that these pipes be continued to such a height as will render impossible the passage from them of sewer air into the building.

With the exceptions before mentioned, the plans are approved, in so far as this Board is required by law to examine and express an opinion.

#### A PROPOSED ADDITION TO THE WESTERN STATE NORMAL SCHOOL, KALAMAZOO.

In accordance with Section 2229, Compiled Laws of 1897, plans for a proposed addition to the Western State Normal School, Kalamazoo, were examined by the State Board of Health.

The plans were explained by E. W. Arnold, of Battle Creek, architect of the building.

The plans contemplate the heating of the building by direct and indirect radiation, and the ventilation by the natural method only.

On page 71 of the specifications for the plumbing work it is provided that the area drain is to terminate at the surface in a "cast iron bell trap and strainer top." As this drain is to discharge into a "dry well" there would be no apparent need for a trap, but simply a strainer to keep leaves and other objects out of the drain. Should a trap be deemed necessary, a bell trap would be entirely unsuited for the pur-

pose, because it has a very shallow water seal, and would often become dry between rains, and probably between the times when water might be thrown on to the area floor. As a strainer, it would not be desirable because the holes in the strainer are small and few, and would be easily choked, and such a condition during a heavy rainfall might cause considerable inconvenience. An ordinary iron grating, set over a brick or cement catch-basin, with an outlet to the drain at or near the top of the basin, would furnish the necessary protection against stoppage of the drain, and would give much better results than the bell trap.

Provision is made for the disconnection of the sewer of the building from the public sewer by a main trap, just inside the building. The location of the trap at this point would leave a considerable portion of the outside sewer without ventilation, and render impossible the cleansing of the sewer beyond the trap without breaking into the sewer; and the same would be true of other sections of the school already constructed and contemplated. It is recommended that all existing main traps be removed; the sewers from each section of the institution be connected with one main sewer; and but one main trap be provided for the present and all future buildings. This trap should be located near to the public sewer, but within the boundary line of the property, and should be surmounted by a manhole and an air inlet, the latter to be carried above the grade a sufficient distance to prevent it being blocked with snow. This arrangement would greatly simplify the disconnection of the private sewers; secure good ventilation of nearly every portion of the private sewers; render unnecessary a number of air inlets in undesirable locations; reduce the possible sources of stoppages (the main traps) to the minimum; and render possible the cleansing of every portion of the sewers.

With the exceptions mentioned, the plans were approved, in so far as this Board is required by law to examine and express an opinion.

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#### EXAMINATION AND LICENSING OF EMBALMERS.

Under the provisions of Act No. 132, Laws of 1903, four examinations were held during the fiscal year 1907, as follows:

Kalamazoo, July 20, 1906.

Marquette, September 25 and 26, 1906.

Lansing, November 21 and 22, 1906.

Detroit, May 1 and 2, 1907.

Of the 122 persons examined, 83 were granted licenses.

Five applications for reciprocal licenses were granted.

A statement of expenses incurred in the operation of Act No. 132, Laws of 1903, may be found on a subsequent page of this report.

## GENERAL WORK, AND EXPENDITURES, IN THE OFFICE OF THE SECRETARY DURING THE FISCAL YEAR 1907.

Much of the work of the office naturally groups itself under three heads.—the collection of information, the compilation of information so collected, and the dissemination of such information as will be of service in the restriction and prevention of disease.

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### COLLECTION OF INFORMATION.

As the local health officer is the principal medium by which this Department may reach and instruct the public in matters pertaining to the prevention of sickness and deaths, the appointment, and the return of the names and postoffice addresses of the health officers, in each year, are matters of more than ordinary interest and importance.

In each year, it is often necessary to make a first, second and third request for information which will place this office in communication with the local health officers, and during the time which is thus used up in corresponding and waiting, an outbreak of a dangerous disease may begin and become widespread before this office can afford the usual assistance to the proper officials in the locality.

It should be said, however, that there is an increasing tendency to comply with the law in this particular, and local boards of health now generally act promptly and cooperate cordially with this Department for the suppression of disease.

Having established communication with the newly appointed local health officers, pamphlets and other publications which may aid them in their work, together with the usual blanks for reports of outbreaks of diseases in their locality, are mailed from this Department. In some instances, considerable correspondence is necessary to instruct the health officials how to properly care for sick and infected persons, and to make reports which will be of value in the compilations for the annual reports and other publications of this Department.

In addition to the collection of the usual information relative to outbreaks of dangerous communicable diseases in this State, special information, upon subjects of public interest and importance, is sometimes asked for and is usually cheerfully furnished by a large number of the health officers and other persons from whom the information is sought.

During the fiscal year 1907, efforts were made to obtain information relative to the three following questions:

1. The measures which are being put forth for the relief and cure of tuberculous persons, and for the prevention of the spread of tuberculosis from such persons to others, in public and private institutions in Michigan.

2. The sources and general character of the public and private water-supplies in Michigan, with special reference to the possibility of their contamination.

3. The progress already made in other States relative to the establishment of bacteriological laboratories in connection with the State Board of Health.

A summary of the information obtained relative to the question numbered one may be found in Part II of this report, under the heading "Tuberculosis in Michigan in 1906 and preceding years." Summaries relative to the questions numbered two and three, may be found on subsequent pages of Part I of this report.

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## DISSEMINATION OF INFORMATION.

As stated in the preceding paragraph, each newly appointed health officer is supplied, by this Department, with information relative to his duties. This information is contained principally in a pamphlet on the "Work of Health Officers," and in pamphlets covering the principal points in the etiology and methods of restriction and prevention of each of the dangerous communicable diseases.

Upon the receipt of information relative to an outbreak of a dangerous communicable disease, in addition to the usual instructions and blanks for making the reports, there are mailed to the health officer a sufficient number of pamphlets, relative to the particular disease then present, for distribution to the families and immediate neighbors of the sick person. In this way, the people are educated as to their duty, under the law, and their cooperation with the local health officers often secured.

A pamphlet covering the law respecting nuisances, and containing information relative to their suppression, is published, and distributed among those persons directly interested, when a complaint of a nuisance is made to this Department.

A pamphlet, giving the law, and regulations of this Department, respecting the preparation and shipment of dead bodies, is published, and distributed among the licensed embalmers, railroad officials, and other persons interested in the transportation of the dead.

### ANNUAL REPORTS.

About 2,500 copies of the annual reports are published each year, and about 2,400 copies are distributed among the following:

Members and Ex-Members of the State Board of Health; Local Health Officers; Secretaries of State, Territorial and Provincial Boards of Health; Sanitary Journal Exchanges; Library Exchanges; City Hospitals and Sanatoriums; Presidents and Secretaries of County Medical Societies; the State Library and the Secretary of State.

### NEOSTYLE WORK.

An important method of disseminating information, which has been used very extensively by this Department, is the preparation, by the

Rotary Neostyle, from time to time as occasion requires, of short articles, letters, etc., upon subjects of interest to the public, and their distribution to editors of newspapers in this State, to the leading sanitary journals, and to any person who may be especially interested, or who will print or use them for the benefit of others.

During the fiscal year 1907, neostyle work to the amount of 18,735 impressions was prepared, and a large portion of it mailed as soon as prepared. The principal subjects were:

Circular letter accompanying placards on the resuscitation of the apparently drowned.

Circular letter to the management of hospitals, sanatoriums, county houses and state institutions, in Michigan, transmitting lists of questions relative to the care and treatment of tubercular patients in such institutions.\*

Circular letter relative to disinfection.

Circular relative to ice cream.\*

"Drought vs. Typhoid Fever."\*

Circular letter to School Boards, relative to the Bulletins of this Department.

Circular letter to embalmers, relative to the enforcement of the law.

Circular letter to health officers relative to making complete final reports.

Circular letter relative to frauds in patent medicines.\*

Circular letter relative to the names of physicians located in townships in Michigan.

Circular letter to Mayors of Cities and Presidents of Villages, relative to cleaning up.\*

Circular letter to health officers, relative to the water supplies of localities in Michigan.\*

Circular letter to the Press, relative to Independence Day.\*

Reports of proceedings of meetings of the State Board of Health.

#### "PUBLIC HEALTH, MICHIGAN," BULLETIN.

During the fiscal year 1907, the principal subjects treated in the BULLETIN were as follows:

*Third Quarter of 1906.*—"Scarlet Fever," by the Michigan Department of Health; "The Importance of Public Health Work," by Governor Fred M. Warner; "Meningitis," by the Michigan Department of Health; "Why and How we Should Exterminate the Fly," by Marion A. Spratt; "Measles," by the Michigan Department of Health; "The Need of a Free Clinical Laboratory for the State Board of Health," by Dr. C. E. Boys; "Whooping-cough," by the Michigan Department of Health; and "Germany's Work in Combating Tuberculosis," by Dr. A. M. Pottenger.

*Fourth Quarter of 1906.*—"Smallpox," by the Michigan Department of Health; "Healthy Laws," by Hon. Wade H. Ellis; "Vaccination and Revaccination will Prevent Smallpox," by the Michigan Department of Health; "Health Officers, their Work and their Pay," by the Montana State Board of Health; "Disinfectants, their Relative Values and Uses," by the Michigan Department of Health; "Water for Table Use," by the Kansas State Board of Health; and "Sewage Disposal," by the New York State Board of Health.

*First Quarter of 1907.*—"The Teacher in Relation to Health," by Woodbridge N. Ferris; "A Plea for the Teaching of Sanitary Science in our Schools," by Delos Fall, Sc. D.; "Health and Efficiency in the Schools," by Prof. D. B. Waldo; "Medical Inspection of our Public

\*Copies of these neostyles may be found on subsequent pages of this report.

Schools," by Guy L. Kiefer, M. D.; "The Public Schools and Dangerous Diseases," by E. M. McElroy; "Teachers, Take Heart and Go On," by Henry R. Pattingill; "The Care of the Eyes and Ears of Children," by Joseph Foster, B. S., M. D.; and "School Sanitation and Inspection of School Property," by Walter H. French.

*Second Quarter of 1907.*—"The Physician and the Nostrum," by Edward Bok; "Railway Sanitation," by J. N. Hurty, M. D.; and "Tuberculosis in Michigan today," by F. W. Shumway, M. D.

WARNINGS TO HEALTH OFFICERS RELATIVE TO IMMIGRANTS, POSSIBLY EXPOSED TO DANGEROUS COMMUNICABLE DISEASES, DESTINED TO SETTLE IN MICHIGAN.

During the fiscal year 1907, thirteen notices were received from the U. S. Commissioner of Immigrants at Philadelphia, Pa., relative to the occurrence of dangerous communicable diseases on board steamships prior to their arrival at that port.

These notices gave the names and destinations of immigrants on board intending to settle in Michigan; and copies of these notices, including the lists of the names of the immigrants, were made on blanks, designed in this office for the purpose, and promptly sent from this office to the health officer of the jurisdiction where the immigrants intended to settle. The purpose of such action is to aid the health officials in preventing outbreaks of dangerous communicable diseases, and, as a matter of fact, this method of forewarning the health officials of the localities where possibly infected immigrants are destined to settle has been productive of good results, and, in recent years, while these measures have been in use, very few outbreaks have been traced to immigrants.

SCHOOL WORK.

In compliance with Act No. 146, Laws of 1897, a copy of a special issue of the "Public Health, Michigan," Bulletin, known as the "Teachers' Edition," is mailed to each teacher and superintendent of the public schools in this State at the beginning of each school year. This manual contains the documents issued by this Department, on the restriction and prevention of nine of the dangerous communicable diseases, the document on "Disinfectants, their relative value and uses," and a list of suggestive questions for teachers. In addition to this manual, each teacher and superintendent is supplied with a copy of each regular quarterly issue of the "Public Health, Michigan," Bulletin.

Upon invitation of the County Commissioners of Schools of the counties of Macomb and Genesee, J. E. McDonald, Deputy Secretary of this Department, attended the following meetings and spoke upon the subjects named:

*Meeting of School Officers of Macomb County.*—Meeting held at Mt. Clemens, April 6, 1907. The subject of "School Sanitation" was thoroughly discussed, with the view of interesting the school officers in seeing that sanitary conditions are at all times maintained in the school buildings.

*Meeting of School Teachers of Genesee County.*—Meeting held at Flint, June 8, 1907. The subject taken up at this meeting was "School Sanita-



tion and the Teacher's Responsibilities." An effort was made to show what every public school teacher can do toward promoting health conditions.

While the law requires that the pupils in our schools shall be instructed in the methods of preventing diseases, it does not require that the buildings in which the pupils are taught shall be equipped with the proper means for securing a constant and adequate supply of fresh air in each of the rooms, and, as a result, a large number of our school buildings are imperfectly ventilated, hence predisposing to disease. In conjunction with the Department of Public Instruction, this Department is earnestly working for better sanitary conditions in our schools, the work, however, on the part of this Department, being limited by the lack of an appropriation for this purpose. In addition to advice by mail relative to the sanitary arrangements of school buildings, the Sanitary Engineer of this Department has, upon request, made inspection of a number of school buildings with the view of determining their sanitary condition and advising the boards of education relative to the necessary changes and improvements. Reports relative to three such inspections may be found on subsequent pages, under the heading "Special Investigations by the Sanitary Engineer."

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#### ADVICE TO LOCAL BOARDS OF HEALTH.

Upon invitation, the Secretary, Deputy Secretary, and Sanitary Engineer of this Department have made visits to localities for the purpose of conferring with the local authorities relative to the suppression of diseases and the correction of insanitary conditions. A record of such visits during the fiscal year 1907, follows:

##### MOVEMENTS OF THE SECRETARY OF THIS DEPARTMENT DURING THE FISCAL YEAR 1907.

In addition to his attendance at the meeting of the State Funeral Directors' Association, and a special meeting of the State Board for the examination of embalmers, at Kalamazoo, July 18 and 19; a meeting in Detroit on July 31, under the auspices of the Detroit Board of Health and in connection with the National Tuberculosis Exhibit; a meeting of State Boards of Health and Embalmers' Examining Boards, at Chicago, September 3 and 4; a meeting of the Ladies' Literary Club of Grand Rapids, December 8; a meeting of the American Medical Association, at Atlantic City, N. J., June 4 to 7; and a meeting of the Graduating Class of Nurses, to instruct them in Public Health work, at Kalamazoo, June 19 and 20; the Secretary of this Department made special visits to the undermentioned localities for the purposes stated:

*Owosso, August 10, 1906.*—To examine the Sugar Company's plant, and to make examination, by boat, of the Shiawassee river from Owosso to Chesaning, relative to the pollution of the river by pulp from the Sugar Factory at Owosso.\*

\*Reports relative to these investigations may be found in the articles on Diphtheria, Smallpox, Typhoid Fever and Nuisances, in Part II of this Report.

*Durand, September 11 and 12, 1906.*—To make investigation relative to the cause of an outbreak of smallpox in the village.\*

*Traverse City, September 17-19, 1906.*—To make investigation relative to the cause of an outbreak of typhoid fever in that city.\*

*Greenfield township, Wayne county, October 19-21, 1906.*—To make investigation relative to the cause of an outbreak of typhoid fever in the township.\*

*State Industrial School for Boys, Lansing, October 29, 1906.*—To make investigation relative to an outbreak of typhoid fever in the School.\*

*DeWitt, November 1, 1906.*—To make investigation relative to the cause of an outbreak of diphtheria in the village.\*

*Buchanan, November 2 and 3, 1906.*—To make investigation relative to the cause of an outbreak of typhoid fever in the village.\*

*Milan, November 15, 1906.*—To make investigation relative to the causation of typhoid fever in the village.\*

*Manclona, November 23 and 24, 1906.*—To make investigation relative to an outbreak of typhoid fever in the village and to look into the question of water supply.\*

*Centreville, February 6 and 7, 1907.*—To make investigation relative to the measures for the suppression of smallpox in the village.†

*Villages of Holly and Ortonville and township of Brandon, Oakland county, March 12-14, 1907.*—To make investigations relative to the measures being taken for the suppression of smallpox in these localities.†

*Highland township, Oakland county, March 26-28, 1907.*—To make investigation relative to the measures being taken for the suppression of smallpox in this locality.†

*Fenton village, Genesee county, and Tyrone township, Livingston county, May 10 and 11, 1907.*—To make investigations relative to the suppression of smallpox in these localities.†

*Sturgis, May 17 and 18, 1907.*—To make investigation relative to the suppression of smallpox in this city.†

*Onondaga, June 25, 1907.*—To make investigation relative to suppression of smallpox in this village.†

SPECIAL INVESTIGATION BY THE DEPUTY SECRETARY OF THIS DEPARTMENT,  
DURING THE FISCAL YEAR 1907.

*Inspection of the Grand River, from Lansing to Grand Ledge, October 22-26, 1906.*—To ascertain the cause of the death of large numbers of fish in the river. A report upon this investigation, together with the findings of the State Analyst, may be found in the article on "Alleged Nuisances in Michigan in 1906." in the latter part of this report.

\*Reports relative to these investigations may be found in the articles on Diphtheria, Smallpox, Typhoid Fever and Nuisances, in Part II of this Report.

†Reports relative to these investigations will be printed in the annual report for 1908.

SPECIAL INVESTIGATIONS BY THE SANITARY ENGINEER OF  
THIS DEPARTMENT, DURING THE FISCAL YEAR 1907.

REPORT RELATIVE TO AN INSPECTION OF THE VENTILATION OF THE  
LARCH STREET SCHOOL, LANSING.

[Division of Sanitary Engineering.]

October 13, 1906.

F. W. Shumway, M. D., Secretary State Board of Health.

Dear Doctor—In accordance with your request, on October 12, in company with C. E. Allen and Dr. Champion, members of the Board of Education, I made an inspection of the system of ventilation at the Larch street school building in this city.

The building is heated and ventilated by the Smead system, which, under the best conditions, is dangerous, and for the following reasons:

The vitiated air from the rooms is caused to pass, through registers in one or more outside walls, into the space under the floors, and from thence *downward* to the basement and over the excreta in the closets, which are connected with vertical flues, extended above the roof and provided with doors, grates, etc., for fires to assist the draft.

Under the best atmospheric conditions, and with proper attention to the ventilating apparatus, this system may accomplish what is claimed for it, but under adverse conditions, which are liable to occur at any time, the opening of doors leading to the hallways, the friction due to the passage of the air over and between the joists, and the taking of air, comparatively warm, *downward* to the basement, all operate to prevent the movement of vitiated air from the rooms, and may result in the reversal of the air currents, with the possible discharge into the rooms of air which has been in contact with the excreta in the closets.

At the time of my visit to the Larch street school, the day was comparatively mild, and consequently not a good day for the proper working of any plant or apparatus dependent upon the natural movement of air.

The air of the seventh grade room, and of the room immediately over it, was, in each case, decidedly close and oppressive; due to the fact that the vitiated air was not passing out of the rooms in sufficient quantity.

In the seventh grade room, the opening of the west door of the room caused a complete reversal of the air currents under the floor, with the discharge of vitiated air back into the room.

There were no fires in the main vent flues on this date, but the flues were heated to some extent by smoke and surplus heat from the furnaces. The doors opening into these flues were open, and admitted cold air, probably reducing the draft in the flues considerably.

A number of openings were discovered in the ceilings under the first floor rooms, all of which would permit air from the basement to pass into the vent ducts formed by the spaces under the floors, or allow air from these spaces to escape into the basement, and probably interfere considerably with the ventilation of the rooms.

Constant fires at the base of each main vent flue, and the sealing of all openings into the vent ducts, are necessary, and will, I believe, result in a marked improvement in the ventilation, not only of the northeast rooms, but of all the rooms in the building.

Respectfully submitted,

(Signed) THOS. S. AINGE.

Sanitary Engineer.

REPORT RELATIVE TO A PROPOSED SEWERAGE SYSTEM FOR THE VILLAGE OF  
EVART.

[Division of Sanitary Engineering.]

October 20, 1906.

F. W. Shumway, M. D., Secretary State Board of Health.

Dear Doctor—In accordance with your request, on October 18, I visited the village of Ewart, Osceola county, and conferred with the President and Trustees of the village relative to the proposed construction of sewers, the necessity for which is very apparent, and has, for many years past, been recognized by a considerable portion of the inhabitants.

The present method of disposing of excreta in the village, by privies and cesspools, in a loose sandy soil is very objectionable and dangerous, for the reason that the seepage from such receptacles causes an unwholesome condition of the subsoil in their immediate vicinity, and probably at a considerable distance from them, and passes readily to the water-bearing strata below.

The cesspools are most numerous in the thickly settled portions of the village, and some of them are very large and deep, in one case extending, so I was informed, to a depth of thirty feet, which is considerably deeper than many private wells, the water from which is used for drinking and domestic purposes.

The danger of using water from any private well in the village is apparent, and the necessity for closing all such wells was strongly urged upon the village authorities.

From local physicians I learned that typhoid fever was then present in the village, four cases existing in one family, and that they had several cases under their observation in the surrounding country. I am satisfied that those cases in the village are due to the insanitary methods of disposing of the excreta and that much more sickness from typhoid fever than has come to the notice of the village authorities has occurred from the same source. There is also a strong probability that many of the cases in adjacent localities are due to infection, by the cesspools of Ewart village, of the underground streams of water from which the water supplies of these localities are derived.

Several years ago, a plan of a proposed sewerage system for the village was prepared, which contemplates the construction of a sewer on Main street, with laterals on certain streets, and an outfall into the river at the foot of Main street, but does not provide for any purification of the sewage before it enters the river. The plan also contemplates the removal, by the proposed sewer, of the surface water at certain points.

The necessity for a filtration plant for the purification of the sewage, and for the separation of the surface water from the sewage, was pointed out. This plan would permit of a smaller, and therefore less expensive, sewer than where the rainfall is to be taken care of by the sewer, and the smaller invert of the sewer would secure a much better flushing of the same when the flow might be small or intermittent.

It is recommended that, in the construction of sewers for this village, however limited may be the extent of the preliminary construction, the plan should include the early cleansing and filling in of every cesspool, and contemplate the ultimate substitution for each privy of a well constructed water closet.

It is also recommended that, pending the extension of the sewers to every part of the village, the privy of each house not on the line of a sewer be converted into a dry earth closet, the construction and care of which to be subject to a uniform plan, to be determined by the local board of health.

Respectfully submitted,

(Signed) THOS. S. AINGE,  
Sanitary Engineer.

INVESTIGATION RELATIVE TO THE CAUSE OF AN OUTBREAK OF TYPHOID FEVER  
AT THE STATE INDUSTRIAL SCHOOL FOR BOYS, LANSING.

On October 29, 1907, the Secretary and Sanitary Engineer of this Department visited the State Industrial School for Boys with the view of ascertaining the source of a severe outbreak of typhoid fever in that

institution. A copy of the report on this investigation may be found in the article on "Typhoid fever in Michigan." on subsequent pages of this report.

REPORT RELATIVE TO AN EXAMINATION OF THE EAST WING OF THE STATE PRISON, JACKSON.

[Division of Sanitary Engineering.]

May 25, 1907.

F. W. Shumway, M. D., Secretary State Board of Health.

Dear Doctor—In accordance with your request, on May 24, I visited the State Prison, at Jackson, and made an examination of the East Wing.

There are five conditions which, in my opinion, render the entire wing unfit for occupancy and dangerous to the health of the occupants:

1. Dampness of the wing, due to the depth of the floor below the grade outside.
2. Insufficient light in all the cells, and the almost entire absence of light in the lowest tiers of cells and in those cells in the northwest corner of the wing.
3. Ridiculously small amount of breathing space in each of the cells.
4. The lack of ventilation for the cells.
5. The lack of toilet accommodation in the cells.

The damp condition of the wing could be overcome by raising the floor to a point above the grade outside and by the construction of an impervious floor.

The lighting could be improved by enlarging the present windows, and by tearing down the building which abuts on the northwest corner of the wing and the construction of a number of windows at that point.

The provision of more breathing space in the cells, and the installation of ventilating apparatus and toilet accommodation for the same, cannot be effected without the tearing down and reconstruction of the cells.

I would recommend the tearing down of the present cells, and the reconstruction of the same along sanitary lines, together with the raising of the floor of the wing and the provision of more and larger windows.

Pending radical changes in the wing, I would strongly recommend the disuse of every cell in the lowest tier and in the northwest corner of the wing, as these cells are considered to be absolutely unfit for human habitation.

Respectfully submitted,

(Signed) THOS. S. AINGE,  
*Sanitary Engineer.*

REPORT RELATIVE TO AN INSPECTION OF THE SCHOOL BUILDING AT MONTROSE.

[Division of Sanitary Engineering.]

June 27, 1907.

F. W. Shumway, M. D., Secretary State Board of Health.

Dear Doctor—In accordance with the request of Dr. J. M. Galbraith, School Director of Montrose, on June 26, I visited that village and made an inspection of the present school building and also of the plans for the proposed enlargement of the building.

There has never been any special provision for the ventilation of the rooms in the present building, and the plans for the proposed addition do not show any, but the specifications state that "Openings are to be left in the inside wall for four 10x12 inch registers and also for register plates in outside wall wherever Building Committee may direct." This arrangement would not secure the ventilation of the rooms, and would be very objectionable because it would result in unpleasant and dangerous currents of air in the rooms.

I would strongly recommend the provision for each room of adequate flues for the supply of fresh air and the removal of foul air so that each pupil will be supplied with not less than thirty cubic feet of fresh air per minute.

By reason of the presence of quicksand, a short distance below the surface of the ground, it is not practicable to build a basement under the school building, and it is proposed to build a boiler house at the rear and heat the building by steam. There is room under the building, however, for the construction of a brick chamber in which the heating of fresh air could be accomplished by in-

direct radiation. This room should have a substantial concrete floor, a plastered ceiling, and a tight-fitting door, so as to render the entrance to the room of air from beneath the building absolutely impossible. The fresh air should be conducted from an adequate opening in the west wall—which should be well screened—to the fresh-air room by an air-tight galvanized sheet iron duct, and the warm air should be conducted to the schoolrooms in galvanized sheet iron flues, with register openings about six or seven feet above the floors.

The foul air should be removed from the rooms by galvanized sheet iron flues, extending from the floor level of each room to the attic, and the vent registers should be in the walls, at the floor levels. These flues should properly be continued above the roof, but as the belfry will be located over the flues they might be carried up to that point, but the opening in the belfry should be equal to the combined areas of the several flues.

All the flues should be on the inside walls and as nearly in the center of the walls as possible.

For the large room on the first floor, the vent flue would require to be not less than three and one-half square feet in area, and for each of the two small rooms, not less than half the area\* of the flue of the large room.

For the second floor rooms, each of the vent flues should have an area of not less than four square feet.

The sizes of the flues have been calculated upon a basis of forty pupils in each of the large rooms and twenty in each of the two small rooms on the first floor.

I would suggest that after the school closets have been thoroughly cleaned out, a layer of dry loamy earth be placed on the bottom of each, and that when they are again used, a daily covering of the excreta by dry earth be carried out. This would render the closets much less objectionable than at the present time.

Respectfully submitted,

(Signed) THOS. S. AINGE.

*Sanitary Engineer.*

REPORT RELATIVE TO AN INSPECTION OF SCHOOL BUILDINGS AT ST. IGNACE.

[Division of Sanitary Engineering.]

July 1, 1907.

F. W. Shumway, M. D., Secretary State Board of Health.

Dear Doctor—In accordance with the request of the Board of Education of St. Ignace, on June 28, I visited that city and made inspections of the Third Ward and LaSalle school buildings, and also examined sketch plans, prepared by the Contractor, for the proposed addition to the building first named.

The *Third Ward School* building is heated by stoves, but there is no provision for the ventilation of either of the rooms. When the addition is made, it is proposed to heat the building by means of a furnace and to provide for the removal of vitiated air from the rooms.

As the sketch plans did not show any provision for the ventilation of the rooms, the proper locations of the warm-air and vent flues, and of the fresh-air room in the basement, were indicated by me on the plans, and the general arrangement of the heating and ventilating apparatus was explained to members of the Board of Education, the Superintendent of Schools, and the Contractor.

Upon a basis of sixteen square feet of floor space for each pupil, each of the rooms in this building will accommodate forty pupils; and for the ventilation of the rooms, with this number of pupils, each vent flue should have an area of not less than four square feet, and should be extended *separately* to a point above the roof, but the three flues may be grouped just beneath the roof, and pass through the roof as one stack.

The warm-air registers should be in the walls, about six feet above the floor levels, and the vent registers should be in the walls at the floor levels.

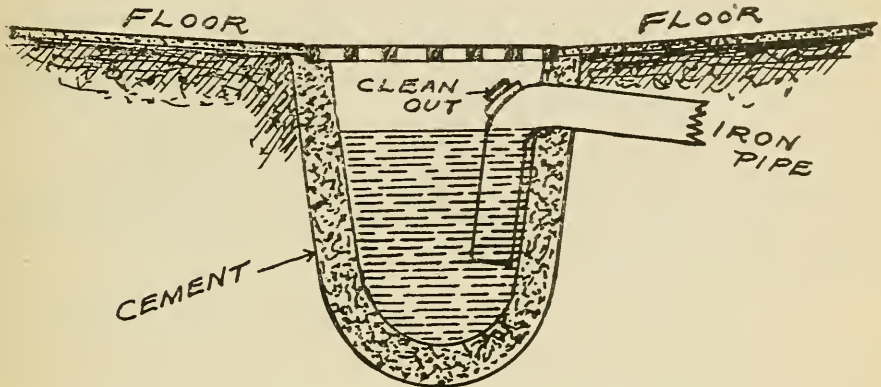
The provision of a large warm-air register in the floor of the hallway would add greatly to the comfort of the pupils and teachers on cold and stormy days, and would prevent the cooling of the air in the rooms by the cold air of the hallway whenever a room door might be opened.

It is proposed to install two toilet rooms in the basement, under the new addition, and it is recommended that each of the rooms have smooth and impervious floors, smooth walls, plastered ceilings and ample ventilation.

The sewer under the building should be constructed of heavy cast iron pipes, and a four inch pipe, of the same material, should extend from the highest point in the sewer to a point above the roof, for the ventilation of the sewer.

Individual closets, of the siphon type, such as are made for school use, are recommended.

For the removal of surface water from the floors of the toilet rooms, an arrangement similar to that shown in the sketch below would be comparatively inexpensive and very efficient.



### FLOOR TRAP.

The *LaSalle School* building is heated by two furnaces, but there is no provision for the ventilation of any of the rooms. An attempt has been made to obtain a change of air in the rooms on the first floor by registers in the floors of some of the rooms and by a large register in the hallway, all communicating with the cold-air ducts in the basement. This is considered an objectionable arrangement, and it is recommended that the air supplies to the furnaces be from outdoors only, and that the change of air in the rooms be accomplished by vent flues, arranged in the same manner as recommended for the Third Ward school.

In the absence of a set of plans for this building, the proper location for the vent register in each room was indicated by a red cross (+) on the wall.

The proper sizes of the vent flues, based upon the number of occupants in each room, are shown in the schedule below:

Room.	Number of pupils.	Area of vent flues in square feet.
FIRST FLOOR.		
Kindergarten.....	40	3.5
First and second grades.....	35	3
Third and fourth grades.....	40	3.5
Fifth grade.....	26	2.3
SECOND FLOOR.		
Sixth and seventh grades.....	40	4
Eighth grade.....	30	3
High school.....	70	7
Science room.....	26	2.6
Library and recitation room.....	20	2

The furnaces in this building are evidently defective in some parts, furnace gases and smoke having been detected escaping from registers in rooms. They should be thoroughly overhauled and repaired, but even then they will not be suitable for the heating of a building of this size. It is recommended that, as soon as practicable, a steam heating plant be installed in place of the furnaces.

If the installation of a steam heating plant is contemplated, now or at any future time, the present heating flues should be reconstructed and arranged in the manner specified for the Third Ward school at the time the vent flues are put in.

What has been said relative to the supply of warm air to the hallway of the Third Ward school will apply with equal force to this school.

It is proposed to make two toilet rooms in the basement of this building, and it is recommended that both be next to outside walls so that they may be well lighted; that individual closets, of the type recommended for the Third Ward school, be used; and that the toilet rooms be well ventilated by special flues carried to the roof separate and distinct from the flue of any room above.

The opening in the floor of the basement, provided for the removal of surface water, was found to be without a trap, and sewer air was entering the building in considerable quantity. It is recommended that the openings in the floors of the new toilet rooms of this building be arranged in the same manner as that recommended for the Third Ward school.

Respectfully submitted,

(Signed) THOS. S. AINGE,

*Sanitary Engineer.*

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INFORMATION RELATIVE TO THE PUBLIC AND PRIVATE  
WATER SUPPLIES OF LOCALITIES IN  
MICHIGAN, IN 1906.

For the purpose of learning the nature of the sources, general character, and possible sources of contamination, of the public and private water supplies of localities in Michigan, copies of the following circular letter and question blank were sent to the health officers of 166 localities in which public water supplies were known to have been installed, and replies were received from all but 19 localities. A brief summary of the replies follows the letter and question blank. In passing, it may be stated that the information thus obtained has already been and will continue to be of much value to this Department in the study of typhoid fever in Michigan:

STATE DEPARTMENT OF HEALTH.

MICHIGAN.

*Office of the Secretary, Lansing.*

[Division of Sanitary Engineering.]

April 20, 1907.

.....M. D.,

Health Officer,

.....Mich.

MY DEAR DOCTOR:

The latest complete information in our possession relative to the water supply of your locality is contained in "The Manual of American Water Works," published, in 1897, by M. N. Baker, Associate Editor of "Engineering News." It is



quite possible that changes have been made since that time, and I shall be greatly obliged if, on the enclosed blank, you will furnish this Department all the information you can, so that the changes, if any, can be noted, and to place the Department in possession of facts which will enable us to make an intelligent and reliable study of the water supplies of localities in the State.

A stamped envelope is enclosed for your reply.

Thanking you in advance for any assistance you may render, and trusting we may have the opportunity to reciprocate.

Very truly yours,  
F. W. SHUMWAY,  
*Secretary.*

INFORMATION RELATIVE TO THE WATER SUPPLIES OF \_\_\_\_\_, MICH.

1. Source of the public water supply.....
  2. If from wells, the nature and depth of same.....
  3. General construction and depth of private wells.....
  4. Approximate proportion of the population using water from the public supply.....
  5. The purity, or otherwise, of the water supply, as indicated by chemical and bacteriological tests.....
  6. The nature of possible sources of contamination of the public water supply.....
  7. Nature of any method in use for the purification of the public water supply.....
  8. Possibility of the contamination of the water in private wells, by reason of their close proximity to cesspools or privies.....
  9. General character of the subsoil, with reference to the possibility of surface water or filth percolating to the water bearing strata.....
  10. Approximate proportion of houses and other buildings:
    - a. Connected with sewers.....
    - b. Connected with cesspools.....
- Information furnished by .....

SUMMARY RELATIVE TO THE PUBLIC AND PRIVATE WATER SUPPLIES  
OF LOCALITIES IN MICHIGAN.

SOURCES OF THE PUBLIC WATER SUPPLIES.

Of the localities heard from, 126 have public water supplies for drinking purposes, obtained from the following sources:

<i>Source.</i>	<i>Number of localities.</i>
Artesian Wells .....	21
Deep Wells .....	23
Shallow Wells .....	24
River, Stream, or Creek .....	14
Great Lakes .....	21
Inland Lakes .....	9
Springs .....	8
Inland Lake and Wells .....	2
Creek and Wells .....	1
Total .....	126

## SOURCES OF THE PRIVATE WATER SUPPLIES.

From the replies in which full particulars relative to the private water supplies were given, it is learned that, in 80 localities, the supplies are derived from wells, of various construction, and varying in depth from 8 to 375 feet, the average depth being 38 feet.

In 3 localities, the minimum depth of the private wells is 8 feet; in 7 localities, 10 feet; in 6 localities, 12 feet; in 7 localities, 15 feet; in 5 localities, 16 feet; in 1 locality, 17 feet; in 2 localities, 18 feet; in 15 localities, 20 feet; in 9 localities, 25 feet; and in 8 localities, 30 feet; a total of 63 localities in which there are many private wells of not more than 30 feet in depth.

## PROPORTION OF THE POPULATION USING THE PUBLIC WATER SUPPLIES.

In 118 localities, from 5 to 100 per cent of the inhabitants are using the public water supplies, the average for the 118 localities being 73 per cent.

## THE PURITY OF THE PUBLIC WATER SUPPLIES.

Of the 99 replies received, in which a definite statement was made relative to the purity of the public water supplies, 79 per cent reported the quality as good; 11 per cent as fairly good; and 10 per cent as of bad quality.

## THE POSSIBILITY, OR OTHERWISE, OF THE CONTAMINATION OF THE PUBLIC WATER SUPPLIES.

The replies from 124 localities indicate that in 43 per cent of these localities the public water supplies are in danger of contamination; that in 6 per cent, the danger of contamination is slight; and that in 51 per cent, the danger of contamination is not apparent.

In this connection, it may be stated that of the 126 sources of the public water supplies, shown above, but 35 per cent, consisting of the artesian and deep wells, may be considered as safe from contamination by surface water and filth.

## MEASURES FOR THE PURIFICATION OF THE PUBLIC WATER SUPPLIES.

The replies relative to this phase of the subject were very meagre, and in many instances in which the danger of contamination of the public water supplies is known to the local authorities, and even where the contamination is known and constant, little, if anything, is being done in the way of its purification.

## CONTAMINATION OF THE WATER IN PRIVATE WELLS.

Of the 103 replies to the question relative to the possibility, or otherwise, of the contamination of the water in the private wells, 47 per cent showed this to be possible, and in many instances probable; 19 per cent showed the danger to be slight; and 16 per cent showed that there was no danger from this source.

The fact that in nearly eighty per cent of the localities heard from

there are many wells of from 8 to 30 feet in depth.—shallow wells—and that, in very many instances, these wells are in a sandy or gravelly formation, with no impervious strata to prevent the percolation to the wells of surface water and filth, would indicate that, as a rule, the private water supplies of cities and villages in this State are at all times in serious danger of contamination.

Two other facts were learned from the replies which have an important bearing upon the question of the possibility of the contamination of the private, and sometimes the public, water supplies, viz., the extent to which localities having public water supplies are provided with sewers and the proportion of buildings in such localities which are provided with cesspools. In localities having public water supplies, but in which there are no sewers or the sewerage system not very extensive, resort will usually be had to cesspools, or the people will continue to make use of the common privies, resulting, in either case, in a serious contamination of the subsoil and the possible contamination of the ground water from which a portion of the water supplies may be obtained. In 74 localities from which replies were received relative to sewerage, the numbers of buildings connected with the public sewers range from 2 to 100 per cent, with a general average of 37 per cent. In 56 localities from which replies were received relative to the extent to which cesspools are used, the numbers of buildings which are connected with cesspools range from 1 to 100 per cent, with a general average of 32 per cent.

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### CLEANING-UP DAY.

For the purpose of inculcating a spirit of cleanliness in the citizens of this Commonwealth, particularly in those resident in the more populous centers, on April 15, 1907, a copy of the following letter was sent to the Mayor of each city and the President of each village in the State. It is believed that the influence of proper action, along the lines suggested in the letter, would be far reaching in its effects, and would, if continued from year to year, result in a marked improvement in the health of the people generally.

#### STATE BOARD OF HEALTH.

MICHIGAN.

*Office of the Secretary, Lansing.*

April 15, 1907.

..... Mich.

Do you take pride in your city? Of course you do. Then inaugurate a "cleaning-up day." Other Mayors in the State are doing this, and why shouldn't you. We have "Arbor Day" when we plant trees for the benefit of future generations. Why not have a cleaning-up day for the health and happiness of the present generation?

The movement appeals to this Department as being a very practical one. Spring time should be a reminder to all of the necessity to clean up the yards. The usual accumulation of garbage—ash piles, vegetable refuse, manure piles,

etc., which necessarily accumulate during the winter months, should be removed from the premises of every home each year during the month of April.

Neglect to do this not only results in untidy and unattractive homes; but if these accumulations are left upon the surface until the coming of the spring rains and warm weather, they become a source of filth and a menace to health. The odors arising from them vitiate the atmosphere; the leachings find their way into the subterranean water channels leading to wells, causing typhoid fever and other diseases; and the manure piles are prize incubators for hatching the myriads of flies that infest our homes.

Vigilance must be the watchword, that the air, the food, and the water upon which man lives, retain their virgin purity. Therefore, this Department would recommend to the Mayors of our Cities and Presidents of the Villages: That you issue a brief proclamation at an early date, naming a certain day, and calling upon your citizens to devote this day to cleaning up around their homes and business places. Lead in this movement by getting out your "White Wings" and take care of the public thoroughfares and alleys. My word for it, a day spent in this way will give greater returns in health and happiness, than the efforts of any other day in the whole year.

All of which is respectfully submitted in the interests of public health.

Very respectfully yours,

F. W. SHUMWAY,

*Secretary.*

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## DANGEROUS FIREARMS AND FIREWORKS.

For the purpose of securing a reduction in the numbers of accidents and fatalities usually associated with the observance of Independence Day, in June, 1907, copies of the following circular and letters were mailed to the presidents of the boards of health in cities and villages and to the editors of newspapers, in this State:

### STATE DEPARTMENT OF HEALTH.

#### MICHIGAN.

*Office of the Secretary, Lansing.*

June 18, 1907.

To the President of the Local Board of Health.

DEAR SIR:

At the time of our national celebration in commemoration of Independence Day, there occur yearly in our State an undue number of deaths, besides a deplorable number of casualties from the use of improper and dangerous fireworks.

Since it is the little children and younger people of our communities who are chiefly the victims of these dangerous explosives, and since it is the judgment of this Department that this practice is a grave menace to our young citizens and that they should receive official protection in their various communities, I respectfully beg to call your attention to the enclosure, which sets forth the facts known connected with dangerous firearms and other explosives, and also the statute of the State of Michigan bearing on the subject.

I earnestly trust this matter may be brought before the proper authorities of your community, for their serious consideration; and I would urge that official action be taken in passing ordinances, or otherwise, to further the protection of human life and limb.

Very truly yours,

F. W. SHUMWAY,

*Secretary.*

## STATE DEPARTMENT OF HEALTH.

MICHIGAN.

*Office of the Secretary, Lansing.*

June 18, 1907.

TO THE EDITOR:

The accompanying circular is sent to the press with a view of reaching the attention of the general public. Therefore, we trust its importance will warrant you in giving it some space in your paper.

Thanking you in advance for the courtesy, I am,

Very sincerely yours,

F. W. SHUMWAY.

*Secretary.*

## THE SALE OF FIREWORKS AND THE MICHIGAN LAW.

## THE PROTECTION OF HUMAN LIFE AND LIMB ON THE FOURTH OF JULY.

A greater number of deaths from lockjaw results after our celebration of the Fourth of July than at any other time. That the increase of fatalities and casualties then occurring can be to a great extent prevented is beyond question; and that it should be prevented is the responsibility of the civil officials in every locality.

The records of deaths both in the United States and Michigan show that deaths from tetanus, popularly called "lockjaw," follow wounds from explosions of blank cartridges, toy pistols, giant firecrackers, cannon firecrackers, torpedo canes and pinwheels. It is not thought that any of these explosives themselves contain the tetanus germ; for the raw materials do not necessarily contain the bacilli causing the disease, and besides the mode of manufacturing fireworks would tend to destroy the bacilli should they chance to be present in the raw materials. Moreover powder explosions occur where grains of the powder enter the flesh without infection from tetanus following. The tetanus germ exists and thrives in the incrustation or dust of filth; and in midsummer in July, the atmosphere is laden with such dust which settles on the skin of human beings. A wound, then, permits this dust so laden with tetanus germs to enter the abrasion of the skin, and, sealed in this excellent medium, tetanus germs become prolific, causing the death of the human being within a short time.

The common use of improper fireworks by children as well as by adults in the celebration of Independence Day, readily explains the unusual death rate from tetanus in the month of July. Following is a table showing the number of deaths in the United States for three years, and in Michigan for the past four years:

Year.	Number of deaths from tetanus fol- lowing wounds from use of fire- works.	
	United States.	Michigan.
1903.....	415	27
1904.....	105	5
1905.....	104	7
1906.....	?	5

It is at once seen that the number of deaths, both in our own State and throughout the entire country in 1903, greatly exceeded the numbers of deaths for the years following. This decrease since 1903 is due chiefly to the aroused public

sentiment and the passing of ordinances against the use of dangerous fireworks, for after the fatalities were recorded in 1903, a crusade against such use was begun; and it is the belief of this Department that if more localities would enforce the state law and pass ordinances to control the sale and use of improper fireworks, many persons would be saved from permanent injury and needless death. In cities where ordinances were passed and enforced, the actual number of accidents was considerably lessened. Is it not worth while to guard against even a high percentage of casualties?

It is the judgment of this Department that if people generally know of the Michigan law governing the sale and use of blank cartridges, toy pistols and other dangerous fireworks; if they know the real danger resulting from their use; if, in addition, local ordinances be passed to control such sale and use, so that people may exercise the care and discretion that will protect their own interests, and merchants may become reluctant to invest in harmful goods; by such action we can prevent to a great extent this dread and fatal disease, tetanus, and guard against needless sorrow.

The law of the State of Michigan is as follows:

#### AN ACT TO PREVENT THE SALE AND USE OF TOY PISTOLS.

[Compiled Laws of 1897, Sections 11530-11532, P. A. No. 138, 1883.]

*The People of the State of Michigan enact:*

SECTION 1. That no person shall sell, give, or furnish to any child under the age of thirteen years, any cartridge of any form or material, or any pistol, gun, or other mechanical contrivance, specially arranged or designated for the explosion of the same.

SEC. 2. Any person, violating any of the provisions of the foregoing section, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than ten dollars, nor more than fifty dollars, and costs of prosecution, or imprisonment in the county jail not less than ten days nor more than ninety days, or both such fine and imprisonment, in the discretion of the court.

SEC. 3. It shall be unlawful for any person under the age of thirteen years, to have in possession, or use any of the articles named in section one of this act.

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#### "THE GREAT AMERICAN FRAUD."

In March, 1907, a pamphlet, published by the Press of the American Medical Association, under the above title, was mailed, with the following letter of transmittal, to the ministers of about one thousand of the several denominational churches in Michigan:

STATE BOARD OF HEALTH.

MICHIGAN.

*Office of the Secretary, Lansing.*

March 15, 1907.

.....,  
 .....  
 MY DEAR SIR:

Recognizing how baneful is the influence, and far reaching in effect the results, following the use of the many proprietary frauds placed on the market today, I am taking the liberty of enclosing under separate cover to you a pamphlet

treating some of these frauds as they should be treated. Not that I consider this pamphlet of any personal interest to you, but I do desire to secure your cooperation, as an educator, through personal and public utterances by you, that the public may be warned against these abominable frauds.

We throw all safeguards that the law makes possible around our live stock, our game and fish, and yet those nearest and dearest to us, entitled to our support and protection, are allowed to go almost unprotected, and exposed to dangers resulting in disease and death.

"Man's inhumanity to man" was never more clearly demonstrated than when we sit idly by and without protest allow frauds of this kind and character to be perpetrated upon an ignorant and unsuspecting public.

If you will, at your leisure, give some thought and consideration to this subject, after which, if it appeals to you, as I believe it will from our standpoint, let me have your support in voicing a just condemnation of all such spurious methods.

Thanking you in advance for what thought you may place on this subject, believe me,

Very truly yours,

F. W. SHUMWAY.

*Secretary.*

The pamphlet under consideration is a reprint of a series of articles on the Patent Medicine Evil, by Samuel Hopkins Adams, which appeared in *Collier's Weekly*.

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## POISONING BY ICE CREAM.

Recognizing the danger to be apprehended from the use of ice cream containing impure ingredients, or which may have become poisoned through carelessness in the making, in the summer of 1906, the following circular was mailed to the editors of about five hundred of the leading newspapers in Michigan, with the request that they publish the same in the interests of the public health:

### ICE CREAM.

With the advent of summer comes the increased consumption of ice cream. And as a consequent, numerous cases of sickness and even deaths from this supposed harmless delicacy. Not a season passes without a number of incidents occurring of sickness and epidemics, the cause of which is directly traced to eating ice cream.

The principal ways by which ice cream is liable to cause sickness are: (1) metallic poisoning, (2) impure flavoring compounds, (3) impure milk or cream, (4) carelessness in allowing any of the ice, salt, or water in the bucket to mix with the cream.

Metallic poisoning is caused by the use of two different metals in the structure of the freezer. Therefore, an ice cream freezer should be made of but one metal—glass or platinum would be ideal. At least, but one metal should be allowed to come in contact with the cream mixture. This objection, we believe, has been largely eliminated in the modern freezer. We have examined a number of different kinds of freezers now on the market, and find them all composed of one metallic compound—heavily tinned iron. These metallic parts to the freezer should be examined often; and when the enameled tin surface is worn off so as to expose the iron, the freezer should be discarded. The danger of metallic poisoning is also increased by allowing the paddle to remain in the cream. It should be removed immediately when the freezing is completed.

It is criminal to put into ice cream impure or poisonous flavoring extracts—yet this very thing is sometimes done. To preserve the fruit flavors in the form of jelly or crushed fruit, both formaldehyde and arsenic have been known

to be used. Further, vanillin and coumarin, crystalline compounds, are frequently colored with caramel and used as substitutes for the pure vanilla flavor. And it is not uncommon to find the fruit flavors (pineapple, strawberry, raspberry, cherry, etc.) to be an artificial product. And to give the cream firmness and reduce its cost, gelatin and starch are not infrequently used. The *safest mixture is pure cream and sugar.*

In the making of ice cream too much caution cannot be exercised in the selection of the cream and milk. These products to be pure and wholesome must be secured from sources where the following conditions exist: (1) The cows must be healthy, well fed, and kept clean. (2) The milk must be handled in a clean and careful manner. (3) The milk should be immediately cooled as soon as drawn from the cows, and kept cool until used. Tyrotoxicosis and other forms of ptomain poisoning, are the direct results of fermentation of unclean milk. Consumers should know that the cows from which their milk is supplied are kept clean. Further, that the milk is handled in a scrupulously clean manner; and that the milk is carried in sterilized cans (thoroughly washed and rinsed with boiling water). Bacteria, and all other forms of germ life, propagate much more rapidly in milk kept at a high temperature. Therefore, the cooling of milk as soon as drawn from the cows is a very important consideration. It should be reduced to a temperature of at least 50 degrees Fahrenheit, and not allowed to rise above that until used.

In the process of freezing, great care should be exercised to prevent any of the freezing mixture (ice, salt, and water) in the tub from getting into the cream in the can. Ice as it is commonly taken from rivers and lakes, is unfit to be used in food or drink. It not infrequently contains disease germs; and is usually laden with animal and vegetable matter. Salt cannot with safety be put into cream. The active sodium chloride dissolves the metals with which it comes in contact, and results in metallic poisoning. For this reason, one should be careful not to allow any of the salt water from the tub to get into the can containing the cream.

Cream is an excellent food, when taken in limited quantities with other articles of diet. Ice is good in refrigerators to maintain low temperatures, in preserving perishable foods. The stomach is no refrigerator—its contents are not to be preserved. Therefore, under normal conditions, ice and iced foods should not be eaten. However, if some people are still "living to eat" and will persist in using this luxury, to such ones we would give the following suggestion: Ice cream mixtures (sugar, cream, and flavors) should be boiled before being frozen. The boiling sterilizes the mixture, and thus reduces the chances from fermentation, and consequent poisoning, to a minimum.

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## STATE LABORATORY.

On subsequent pages of Part I. of this report may be found a copy of the law establishing a laboratory in connection with the State Board of Health of this State. As the law did not take effect until May 22, 1907, no statement can be made in this report relative to the organization of the laboratory.

Prior to the passage of the law establishing a laboratory in connection with this Department, correspondence was had with other State and Territorial Boards of Health with the view of ascertaining what has been done in other parts of the United States and its possessions, along this line. A summary of the information thus obtained is here given in the hope that it may be of service to other State Boards of Health in the consideration of the question of the establishment of laboratories, and to those who wish to make special study of this subject:



STATES AND TERRITORIES HAVING LABORATORIES CONNECTED WITH THE  
BOARDS OF HEALTH PRIOR TO JANUARY 1, 1907.

	When established.	Cost of equipment.	Salary of bacteriologist.	Number employed in laboratory.	Annual appropriation.	Analyses per year.			
						Disease.	Water.	Miscellaneous.	Total
Maine.....	1903	\$2,000	\$1,200	2	\$3,000	1,284	350	5,000	6,634
Massachusetts.....			3,200	25	32,000	4,472	3,169	33,478	46,119
Rhode Island.....	1905		1,500	4	3,000	2,500	1,200		3,700
Connecticut.....	1905	1,200	1,500	2	4,000				
Vermont.....	1898	5,000	2,500	6	10,000	4,025	668	638	5,331
New Hampshire.....	1901	3,000	1,500	4	6,000				
New York.....		3,500	3,000	10	21,000	1,500	500	20	2,030
New Jersey.....	1887	4,000	2,000	5	*	8,500	600	3,650	12,750
Delaware.....	1899	3,000	1,700	2	2,500				
Ohio.....	1898	3,000	1,500	5	*	1,560	1,125	720	3,405
Indiana.....	1905	3,000	1,800	4	5,000				
Illinois.....	1904	500	1,200	1	3,000	2,520		120	2,640
Wisconsin.....	1903		900	3	2,000	317	365	7	689
Minnesota.....	1896			9	10,000	6,966			
Oregon.....	1903	2,500	720	1	*	699	118	201	1,018
North Carolina.....	1905		2,000	2	2,500				
Georgia.....	1904	5,000	1,000	6	5,500				
Florida.....	1902	2,000	2,000	2	500	2,700	100	200	3,000
Missouri.....	1903		1,500	1	1,500				
Utah.....	1903	3,000	1,000	1	500	250	20	875	1,145
Hawaii.....	1898	3,000	2,100	1	*				

Fourteen States have no laboratory connected with the State Board of Health.

Five States have laboratories of the State Board of Health at some State Institution.

Six States have work of the State Board of Health done at a private laboratory. This last plan is a very expensive method, costing the States much more than it would to maintain a laboratory under department supervision.

The general fund is unlimited in the three States and one Territory indicated by a \*.

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE  
STATE BOARD OF HEALTH (UNDER PUBLIC ACT NO. 18 OF 1905),  
DURING THE FISCAL YEAR ENDING JUNE 30, 1907.

Expenses of members:	
Attending regular meetings .....	\$74 05
Other expenses .....	238 99
Engraving, drawing, etc. ....	70 48
Instruments and books .....	325 53
Paper, stationery, etc. ....	1,459 43
Postage .....	1,800 00
Printing and binding .....	2,247 84
Secretary .....	2,500 00
Special investigations .....	147 27
Expressage .....	32 42
Telegrams .....	17 43
Telephone .....	36 94
Miscellaneous .....	49 62
 Total .....	 \$9,000 00

NOTE.—The appropriation (\$9,000) at the disposal of the State Board of Health for certain specified purposes, does not include clerk hire. The account for clerk hire is kept in the Auditor General's department, and is published in his annual report.

Respectfully submitted,  
F. W. SHUMWAY,  
*Secretary.*

TOTAL AMOUNT AND CLASSIFICATION OF EXPENDITURES BY THE STATE  
BOARD OF HEALTH (UNDER SECTION 7 OF ACT 132, LAWS OF 1903),  
EMBALMERS' FUND, AS ALLOWED DURING THE FISCAL  
YEAR, 1907.

RECEIPTS.	DISBURSEMENTS.
Fees from applicants for license and for renewals of licenses. . \$1,008 50	Expenses of members attending meetings..... \$238 56
	Paper, stationery, etc..... 105 40
	Postage..... 190 00
	Printing and binding..... 107 93
	Drawing, engraving, etc..... 22 00
	Compensation of extra clerks.. 248 00
	Miscellaneous..... 94 84
	Unexpended balance, turned over to State Treasurer..... 1 77
Total receipts..... \$1,008 50	Total disbursements..... \$1,008 50

## PUBLIC HEALTH LEGISLATION IN MICHIGAN IN 1907.

During the legislative session of 1907, the following public acts were passed and approved:

## ACT NO. 151, PUBLIC ACTS OF 1907.

An Act to amend sections one, two, three, eight and nine of act number one hundred thirty-two of the Public Acts of nineteen hundred three, being an act, entitled "An act empowering the State Board of Health to determine the qualifications necessary, examine and license persons qualified to practice the art of embalming and regulate the practice of embalming dead human bodies, and to repeal act number two hundred thirty-three of the Public Acts of nineteen hundred one."

*The People of the State of Michigan enact:*

SECTION 1. Sections one, two, three, eight and nine of act number one hundred thirty-two of the Public Acts of nineteen hundred three, being an act, entitled "An act empowering the State Board of Health to determine the qualifications necessary, examine and license persons qualified to practice the art of embalming and regulate the practice of embalming dead human bodies, and to repeal act number two hundred thirty-three of the Public Acts of nineteen hundred one," are hereby amended to read as follows:

SECTION 1. The State Board of Health is hereby authorized and empowered to determine the qualifications necessary to enable any person to properly embalm dead human bodies and disinfect the premises. The said Board, or some member thereof, shall examine all applicants for an embalmer's license, and shall issue an embalmer's license to all persons who successfully pass such examination. No person shall embalm any dead human body, unless he shall hold a valid unrevoked and unexpired license from the Michigan State Board of Health authorizing him to practice the art of embalming. All persons who are engaged in the business of undertaking, or who profess to be engaged in such business, or who hold themselves out to the public as undertakers, or embalmers, shall be required to possess a certificate showing that they are licensed embalmers or have constantly employed a licensed embalmer. Any person embalming or attempting to embalm, or caring or attempting to care for a dead human body, either as an embalmer or as assistant embalmer or undertaker, except under the immediate and personal direction of a licensed embalmer, shall be deemed to be practicing the art of embalming, and any person so embalming or caring, or attempting to care for a dead human body, or who shall prepare for transportation or burial or otherwise dispose of any dead human body, or hold himself out as practicing embalming, without being the holder of an embalmer's license granted by the State Board of Health, shall be deemed guilty of a violation of this act. The term embalming as used in this act shall be taken to mean the disinfection or preservation of the dead human body, entire or in part, by the use of chemical substances, fluids or gases ordinarily used, prepared or intended for such purpose, either by outward application of such chemical substances, fluids or gases on the body, or by the introduction of same into the body by vascular or hypodermic injection or by direct application into the organs or cavities. The finding of any such chemical substance, fluid or gas ordinarily used in embalming, or any trace, evidence or appearance thereof upon a dead human body, the use of which is prohibited except by licensed embalmer, or the placing thereof on a dead human body by any person who is not a holder of an embalmer's license shall constitute prima facie evidence of the violation of the terms of this act: Provided, That nothing in this act shall apply to any person who prepares dead human bodies for burial without the assistance of an undertaker or embalmer, or without acting in the capacity of an embalmer or undertaker.

SEC. 2. Embalmers' examinations shall be held in the city of Lansing at least once each year, and at such other times and places as the said board may designate: Provided, That an examination shall be held once each calendar year

in the Upper Peninsula, if five or more residents of the Upper Peninsula shall have on file with the secretary of the said board their applications for licenses. The said board is hereby authorized to send not more than two of its members to the Upper Peninsula to conduct embalmers' examinations there. The members of the said board, except the secretary, who are present and assist in any such examinations shall receive ten dollars per diem for the time actually spent, in addition to reimbursement for such expenses as they may actually incur.

SEC. 3. No person shall be granted a license under this act, unless he shall have had at least two years actual, practical instruction in embalming and disinfecting under a licensed embalmer in this State, or at least one year of such instruction and has completed a course in some school of embalming whose standing is recognized by the State Board of Health, or who shall have been actively engaged in the practice of embalming for five years last past prior to the date of his examination. Each applicant for a license shall be examined orally and in writing in the following subjects: Anatomy, sanitary science and disinfection, the care, preservation, embalming, transportation and burial of dead human bodies, and shall, at the request of the board, demonstrate his proficiency as an embalmer by operation on a cadaver. All applications under this act shall be upon blanks furnished by the State Board of Health and shall be accompanied by a fee of five dollars and a photograph of the applicant. All applicants for license to practice embalming shall have attained the age of twenty-one years and must furnish a certificate of good moral character, signed by three responsible citizens, one of whom must be a licensed embalmer who has been personally acquainted with the applicant for at least one year. All applicants shall furnish the State Board of Health satisfactory evidence of their proficiency in a common school education, that they have had at least two years' practical experience under a licensed embalmer in this State, or have had a practical experience of not less than one year under a licensed embalmer in this State and have completed the regular course of instruction in a school of embalming recognized as being in good standing by said board: Provided, That any person now holding an embalmer's license issued by the State Board of Health under authority of act number one hundred thirty-two of the Public Acts of nineteen hundred three, shall be deemed to be a licensed embalmer under the provisions of this act, but such license shall terminate and expire on the thirty-first day of July, nineteen hundred seven, unless sooner revoked or cancelled, who shall be entitled to registration without examination upon payment of the fee herein provided for: Provided further, That any person holding a valid, unrevoked and unexpired license in another state or territory having substantially similar requirements to those existing in this State, provided that such states or territories recognize licenses issued by the Michigan State Board of Health, may be granted a license to practice in this State upon filing with the secretary of this Board a certified statement from the secretary of the examining board of the state or territory in which the applicant holds a license, showing the rating upon which said license was granted, together with his recommendation, and if satisfactory to this board it shall, upon receipt of a fee of ten dollars grant such license. The owner of any license or renewal provided for in this act shall cause a copy of same to be filed in the office of the local registrar of each city or village wherein he intends to practice the art of embalming, and no transportation permit shall be issued by the local registrar to any person who has not a copy of such license or renewal on file: Provided, That any local registrar is hereby authorized to grant a transportation permit to any embalmer coming from beyond the jurisdiction of said registrar upon the exhibition of a copy of said license or renewal to said registrar. It shall be unlawful for any railway agent, express agent, baggage master, conductor, or other person acting as such, to receive the dead body of any person for shipment, or transportation by railway or other public conveyance, to or from any point in this State or to a point outside of this State, unless said body be accompanied by a removal or shipping permit signed by the health officer of the local board of health, and a certificate, attached to the outside box containing such body, showing the name and official number of the embalmer by whom it was prepared, and the method of preparation employed: Provided, That nothing in this act shall be so construed as to prevent the shipment of dead bodies intended for use for anatomical purposes within this State when the same are so designated by the shipper.

SEC. 8. Whenever the State Board of Health shall have reason to believe that

any person to whom a license has been issued has become unfitted to practice embalming and disinfecting, or has violated any of the provisions of this act, or any rule or regulation prescribed, or whenever written complaint of a licensed embalmer, substantiated by affidavits thereto, charging the holder of an embalmer's license with the violation of any provision to this act is filed with said board, it shall be the duty of the said board to notify the person in question that it has reason to believe that he has violated the provisions of law and that his license ought to be revoked, which notice shall be served upon him either by registered mail or personal service: Provided, That when a written complaint against any such person is filed with said board, either by a member thereof or a licensed embalmer, a copy thereof shall be attached to the notice so served upon such person. The said notice shall set forth in what particulars it is claimed there has been a violation of the law, or for what reason the person is believed to be unfitted to longer prosecute the business of an embalmer. The said board shall in such notice definitely fix a time and place when and where it will be in session for the purpose of considering such person's case, which time shall not be less than twelve days after the service of notice upon the person. Such person shall have the right to appear before the said board at such time and place to dispute the charges made in said notice. Any member of said board shall have the right to administer oaths to witnesses. If, after considering all of the facts and circumstances the board shall have sufficient reason to believe that there has been a violation of the provisions of this act, or a violation of any rule or regulation prescribed by the said board for the preparation, embalming, shipping or burial of any dead human body, or that such person is unfitted to remain a licensed embalmer in this State, it shall have the right to revoke and cancel the license theretofore granted to such person.

SEC. 9. Any person who shall violate any of the provisions of this act, upon conviction thereof, shall be punished by a fine of not less than three hundred dollars nor more than one year, or both such fine and imprisonment, in the discretion of the court. Prosecutions for the violation of any of the provisions of this act, may be brought by any person in the name of the people of the State of Michigan, against any person violating any of the provisions of this act, before any court of competent jurisdiction. It is hereby made the duty of all prosecuting attorneys to see that the provisions of this act are enforced in their respective counties. It shall also be the duty of all health officers in their respective cities and townships to inform against and assist in the prosecution of all persons whom there is reasonable cause to believe are guilty of violating any of the provisions of this act.

This act is ordered to take effect September eighth, nineteen hundred eight.  
Approved June 17, 1907.

#### ACT NO. 109, PUBLIC ACTS OF 1907.

An act to provide for the appointment of a bacteriologist by the State Board of Health; to provide for the purchase of the necessary appliances and apparatus for bacteriological examinations, and providing an appropriation therefor.

#### *The People of the State of Michigan enact:*

SECTION 1. The State Board of Health is hereby authorized and empowered to employ a competent bacteriologist, whose duties shall be such as are or may be defined by law or defined by said Board of Health, and shall be performed in connection with the Department of Public Health. The salary of the person appointed bacteriologist shall be fixed by the said Board of Health.

SEC. 2. The bacteriologist whose appointment is herein provided for shall conduct the routine work in connection with bacteriological examinations and analyses that may be necessary, authorized or required by the provisions of this act or ordered or directed by the said Board of Health, all of which shall be under the supervision of the secretary of said board.

SEC. 3. The various boards of health and health officers may require a bacteriological examination or analysis of blood, sputum, urine, water, milk, or other substance in localities where there is an outbreak of any contagious disease or epidemic in which bacteriological examination or analysis may be necessary to

the public health and welfare, or for the purpose of locating sources of infection, or contamination of water, milk, ice, etc., as the case may be. The said State Board of Health shall also be required to make an examination and analysis of the water used by the public, and of public water supplies, when contamination is suspected, whenever the examination or analysis is required by the mayor of any city, the president of any village, or the supervisor of any township. Such boards or officers shall forward or deliver to the secretary of the State Board of Health a sample of the substance required to be analyzed, in a sealed package or jar accompanied by a statement from such board or officer, indicating the necessity for the analysis. The examination or analysis for the boards or officers above named shall be made free of charge. The State Board of Health shall also make a bacteriological examination or analysis in all matters of a criminal nature whenever requested by the prosecuting attorney of the county in which the case may arise: Provided, however, That any prosecuting attorney requiring any analysis of a criminal nature shall be required to pay to the said State Board of Health the nominal cost of the materials used and for the time necessarily spent in making such examination or analysis, which amount shall constitute a charge against the particular county and shall be covered into the State Treasury to the credit of the bacteriological fund in addition to the amount herein appropriated, and may be drawn by the State Board of Health in the manner now provided by the accounting laws of this State for the purpose of maintaining or adding to the equipment of the bacteriological division of the Department of Health.

SEC. 4. The said Board of Health is hereby given authority to purchase any and all such apparatus and appliances as shall be necessary to carry out the provisions of this act: Provided, That the amount paid as salary to the bacteriologist and expended for apparatus and appliances, in any one year, shall not exceed the amount of the yearly appropriation provided for in this act: Provided further, That any part of the appropriation herein provided for, not expended for the salary of the bacteriologist or for purchasing apparatus, material and appliances, may be used by the said Board of Health in compiling general information in regard to bacteriological examinations and for such other purposes in connection with the bacteriological work of the Department of Public Health as shall be deemed advisable and necessary by the said board.

SEC. 5. There is hereby appropriated out of the moneys in the treasury, to the credit of the general fund not otherwise appropriated, the sum of five thousand dollars for the fiscal year ending June thirty, nineteen hundred eight, and the sum of thirty-five hundred dollars annually thereafter for the purpose of carrying out the provisions of this act, which amount shall be paid to the State Board of Health in the manner now provided in the general accounting laws of this State.

This act is ordered to take immediate effect.

Approved May 22, 1907.

ACT 163, PUBLIC ACTS OF 1907.

An act to amend section three of act number two hundred thirty-seven of the Public Acts of eighteen hundred ninety-nine, entitled "An act to provide for the examination, regulation, licensing and registration of physicians and surgeons, and for the punishment of offenders against this act, and to repeal acts and parts of acts in conflict therewith," as amended by act number one hundred ninety-one of the Public Acts of nineteen hundred three and acts numbers fifty-six and one hundred sixty-one of the Public Acts of nineteen hundred five.

*The People of the State of Michigan enact:*

SECTION 1. Section three of act number two hundred thirty-seven of the Public Acts of eighteen hundred ninety-nine, entitled "An act to provide for the examination, regulation, licensing and registration of physicians and surgeons, and for the punishment of offenders against this act, and to repeal acts and parts of acts in conflict therewith," as amended by act number one hundred ninety-one of the Public Acts of nineteen hundred three, and acts numbers fifty-six and one

hundred sixty-one of the Public Acts of nineteen hundred five, is hereby amended to read as follows:

SEC. 3. On and after the date of the passage of this act, all men and women who wish to begin the practice of medicine and surgery in any of its branches in this State, shall make application to the State Board of Registration in Medicine, to be registered and for a certificate of registration. This registration and certificate shall be granted to such applicants as shall give satisfactory proofs of being twenty-one years of age and of good moral character, but only upon compliance with at least one of the following conditions contained in subdivisions one, two and three of this section:

First, The applicant shall be registered and given a certificate of registration if he shall satisfactorily pass an examination under the immediate authority and direction of the board upon the following subjects: Anatomy, physiology, chemistry, pathology, materia-medica and therapeutics, toxicology, histology, practice of medicine, surgery, obstetrics, gynecology, mental and nervous diseases, diseases of the eye, ear, nose and throat, bacteriology, hygiene, public health laws of Michigan and medical jurisprudence; said examination to be conducted as follows:

(a) The applicant shall pay a fee of twenty-five dollars prior to examination: Provided, That if the examination is divided the applicant shall pay ten dollars for the first examination and fifteen dollars for the final examination;

(b) The examination shall be in writing, oral, or both;

(c) The questions on all subjects, except in materia-medica and therapeutics and practice of medicine, shall be such as may be answered alike by all schools of medicine;

(d) The applicant shall, if possible, be examined in materia-medica and therapeutics and practice of medicine by those members of the board or by a qualified examiner appointed by the board, belonging to the same school as the applicant, and no applicant shall be rejected because of his adherence to any particular system of practice;

(e) An average percentage of at least seventy-five per cent of correct answers on all of the subjects listed under this section, and of not less than fifty per cent on each subject, shall be required of every applicant: Provided, That in the case of a qualified applicant who has been in reputable practice at least five years, at the discretion of the board, this requirement of minimum percentage may be modified by the board to meet the necessities of the case. No additional fee shall be charged by this board for the registration of those who successfully pass such examination: Provided, however, That such applicant for examination shall have a diploma from a legally incorporated, regularly established and reputable college of medicine within the states, territories, districts and provinces of the United States, or within any foreign nation, provided such foreign nation accord a like privilege to graduates of approved medical colleges of this State, having at least a four years' course of seven months in each calendar year, as shall be approved and designated by the Board of Registration in Medicine: Also Provided, That such applicant shall have, previous to the beginning of his course in medicine, a diploma from a recognized and reputable high school, academy, college or university, having a classical course, or shall pass an examination equivalent at least to the minimum standard of preliminary education adopted and published by the board before examiners appointed by and in accordance with the regulations of aforesaid board, and at such time and place as the board may designate: Provided, A student entering a college in Michigan, having a preliminary examination of a standard approved by the Board of Registration of Medicine shall not be required to take this examination: Provided, That this requirement of preliminary education shall not apply to those students who, on the date of the passage of this act, were regularly registered as students of legally organized and reputable medical colleges approved of by said board: And Provided also, That the requirement of medical education shall not apply to those graduates of legally organized and reputable medical colleges approved of by said board who had graduated from such colleges, previous to the date of the passage of this act; and students complying with the other provisions of this section who, on January first of the present year, were regularly registered as students of legally organized and reputable medical colleges of this State, approved of by said board, may obtain a certificate of registration as graduates of such colleges and without examination by the board upon payment of a fee of ten dollars. The Board of Registration in Medicine shall, from time to time, adopt and pub-

lish a minimum standard of medical education, and no medical college shall be approved and designated by said board under this subdivision one, of section three, unless, in the judgment of the board, it conforms with such standard: Provided, That any raising of the standard of medical education, including preliminary education, by the board under this provision shall not go into effect until at least one year after its adoption and publication by the board: And Provided further, That the standard of preliminary education under the provisions of this act shall not exceed the standard fixed for admission to the literary department of the University of Michigan;

Second, The applicant shall be registered and given a certificate of registration if he shall present a certified copy or certificate of registration or license which has been issued to said applicant in any foreign nation where the requirements of registration shall be deemed by said Board of Registration in Medicine to be equivalent to those of this act: Provided, Such country shall accord a like privilege to holders of certificates from this board. The fee for registration from applicants of this class shall be fifty dollars;

Third, The applicant shall be registered and given a certificate of registration if he shall present a certified copy of certificate of registration or license which has been issued to said applicant within the states, territories, districts or provinces of the United States where the requirements for registration shall be deemed by the Board of Registration in Medicine to be equivalent to those of this act, and shall otherwise conform to the rules and regulations agreed upon between the State Board of which he is a licentiate and said board relative to the recognition and exchange of certificates between states. The fee for registration from applicants of this class shall be fifty dollars;

Fourth, If any person shall unlawfully obtain and procure himself to be registered under this section, either by false and untrue statements contained in his application to the Board of Registration in Medicine, or by presenting to said board a false or untrue diploma or license, or one fraudulently obtained, he shall be deemed guilty of a felony, and on conviction thereof shall be punished by a fine of not less than three hundred dollars nor more than five hundred dollars, or imprisoned at hard labor for not less than one year, nor more than three years, or both, at the discretion of the court, and shall forfeit all rights and privileges obtained or conferred upon him by virtue of such registration as a physician or surgeon;

Fifth, Any person who shall swear falsely in any affidavit or oral testimony made or given by virtue of the provisions of this act, or the regulations of the Board of Registration in Medicine, shall be deemed guilty of perjury, and upon conviction thereof, shall be subject to all the pains and penalties of perjury;

Sixth, The Board of Registration in Medicine shall refuse to issue a certificate of registration provided for in this section to any person guilty of grossly unprofessional and dishonest conduct. The words "unprofessional and dishonest conduct." as used in this act, are hereby declared to mean:

First, The procuring, aiding or abetting in procuring a criminal abortion;

Second, The obtaining of any fee on the assurance that an incurable disease can be permanently cured;

Third, The wilfully betraying of a professional secret;

Fourth, All advertising of medical business in which grossly improbable statements are made, or where specific mention is made in such advertisements of venereal diseases or diseases of the Genito-urinary organs;

Fifth, Having professional connection with, or lending one's name to an illegal practitioner of medicine; or having professional connection with any person who had been convicted in a court of competent jurisdiction under the provisions of this section;

Sixth, All advertising, of any nature or kind, of any medicine, or of any means for the regulation or re-establishment of the menses;

Seventh, All advertising of any matter of an obscene or offensive nature derogatory to good morals;

Eighth, Employing any capper, solicitor or drummer for the purpose of securing patients; or subsidizing any hotel or boarding-house with a like purpose; or paying or presenting to any person money or any other thing of value with a like purpose;

Ninth, Being guilty of offenses involving moral turpitude, habitual intemperance, or being habitually addicted to the use of morphine, opium, cocaine or other



drugs having a similar effect. It shall be a misdemeanor for any person to be guilty of "unprofessional and dishonest conduct" as defined in this act. Any person who shall be charged with the commission of such misdemeanor shall be tried in a court of competent criminal jurisdiction and upon conviction thereof shall be fined for each offense not to exceed two hundred and fifty dollars, or shall be imprisoned in the county jail not to exceed three months, or may be both fined and imprisoned in the discretion of the court. The creation of such misdemeanor by this act shall not be construed to supersede any existing remedy or punishment, whether civil or criminal for any act embraced within the provisions of this act, but shall be construed to be in addition thereto. The Board of Registration in Medicine shall, upon the filing with it of a duly certified copy of a final conviction, obtained in accordance with the provisions of this act, revoke or suspend for a limited period, not less than six months, the certificate of the person so convicted. Said board may, after fair hearing, revoke any certificate of registration heretofore or hereafter granted upon mistake of material fact or by reason of fraudulent misrepresentation of fact by such applicant. The said Board of Registration shall also revoke any certificate obtained through fraud or perjury, or the certificate of any person guilty of a criminal offense created by or embraced within the provisions of this act, when such criminal offense or such fraud or perjury shall have been legally established in a court of competent jurisdiction.

This act is ordered to take immediate effect.

Approved June 18, 1907.

ACT NO. 285, PUBLIC ACTS OF 1907.

An act to amend section six of act number three hundred thirty of the Public Acts of nineteen hundred five, entitled "An act to provide for the immediate registration of births, and the requiring of certificates of births," approved June twenty, nineteen hundred five.

*The People of the State of Michigan enact:*

SECTION 1. Section six of act number three hundred thirty of the Public Acts of the State of Michigan for the year nineteen hundred five, approved June twenty, nineteen hundred five, is hereby amended to read as follows:

SEC. 6. Every physician, midwife, or nurse shall be entitled to be paid the sum of fifty cents for each certificate made and filed by such physician, midwife or nurse as provided in section two of this act, and each local registrar shall be entitled to be paid the sum of twenty-five cents for each birth certificate properly and completely made out and registered with him and by him returned to the Secretary of State, on or before the fourth day of the following month, which sum shall include the making of the copy of the certificate to be filed and preserved in his office. Certificates lacking certain items, including the given or Christian name of the child as to children not named at the date of filing the report, shall not be considered as defective, providing the missing information is obtained and returned to complete the certificate as elsewhere provided in this act: Provided, That the registrar for the city of Detroit and the registrar for the city of Grand Rapids shall receive no compensation for the duties required under this act. In case no births occurred during the calendar month, the local registrar shall be entitled to be paid the sum of twenty-five cents for each report to that effect promptly made in accordance with the requirements of this act. All amounts payable to such registrar under the provisions of this section shall be paid by the treasurer of the county in which the registration district is located upon presentation of a proper warrant, issued by the Secretary of State. And the Secretary of State shall issue warrants in favor of local registrars at the end of their official years, or for the year ending March thirty-first, when continuing in office, specifying the number of certificates properly registered and promptly returned, and the number of prompt monthly reports made by each, to the effect that no births occurred, with the amount due at the rate fixed herein. Any physician, midwife or nurse, who shall be entitled to any of the fees provided by this act, shall, on or before the first day of April of each year, file a sworn, itemized statement, upon such blanks as the Secretary of State shall prescribe, of his or

her claim for such fees for the year beginning April one preceding, with the local registrar of the township or city where such certificates were filed; and the local registrar shall compare the statement so filed with the records in his office, and, if the said statement is correct, shall endorse thereupon his approval of the same in writing. The Secretary of State, upon receipt of such sworn statement, approved by the local registrar, as aforesaid, shall issue his warrant in favor of such physician, midwife or nurse for the amount of such fees. Upon presentation of said warrant to the treasurer of the county in which the registration district is located, the county treasurer shall pay the same, in the same manner and out of the same fund that the fees of the local registrar are paid.

Approved June 27, 1907.

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## PROPOSED PUBLIC HEALTH LEGISLATION IN MICHIGAN IN 1907.

During the legislative session of 1907, the following bills were introduced in the legislature but failed to become laws:

### SENATE BILL NO. 139, 1907.

A bill to provide for the inspection of plans and specifications for the construction and reconstruction of public school buildings and for the correction of unsafe or insanitary conditions of school buildings and appurtenances thereof in certain cases.

#### *The People of the State of Michigan enact:*

SECTION 1. The secretary of the State Board of Health and the Superintendent of Public Instruction shall constitute a board to be known as the state board of inspectors for public school buildings, and it shall be the duty of said board to inspect the plans and specifications for the construction and reconstruction of public school buildings; and to make inspection of and require the correction of unsafe or insanitary conditions in public school buildings in this state as hereinafter provided.

SEC. 2. No schoolhouse or school building, the cost of which is over five hundred dollars, shall hereafter be erected in any district or city in this State, and no addition to or reconstruction of a school building, to the extent of five hundred dollars or more, in any district or city, be erected or constructed, nor shall any contract be entered into in regard to such construction or reconstruction, until the plans and specifications, in duplicate, shall have been submitted to the state board of inspectors for public school buildings and have been approved by such board. The plans and specifications of such buildings shall show in detail the provisions for the ventilation, heating, lighting, and the methods of disposal of excreta, and the state board of inspectors for public school buildings shall designate upon the plans the maximum number of persons who may safely occupy each room for the purpose of study or recitation.

SEC. 3. Whenever the state board of inspectors of public school buildings shall be notified by any board of education, or any member thereof, or by the county commissioner of schools in the county, that the conditions of any public school building or its appurtenances are unsafe or insanitary, said board shall, as soon thereafter as possible, visit the premises and carefully inspect the building, and if the said board shall be satisfied that the same is not in a safe or sanitary condition, they shall so notify the board of education or other persons having jurisdiction over such building, and said board shall have authority to forbid the further occupation of the building for school purposes until it is rendered safe or sanitary.

SEC. 4. The state board of inspectors of public school buildings shall inspect all buildings repaired or newly constructed, upon the completion of the work, or at any time during the process of construction, to determine whether the work has been done or is being done in conformity with the approved plans. In order

to enforce the decisions of said board of inspectors of public school buildings, it shall have authority to institute proper legal proceedings in courts of competent jurisdiction against the board of education of any school district or city, or against any contractor for violation of its decisions and directions, or for refusal or neglect to execute the same when properly notified. Any board of education or firm of contractors, or individuals composing the same, who shall wilfully neglect or refuse to execute the directions of the state board of inspectors of public school buildings shall be deemed guilty of a misdemeanor and shall upon conviction thereof in a court of competent jurisdiction be punished by a fine of not less than five dollars or more than one hundred dollars, or be imprisoned in the county jail not less than five nor more than sixty days, or by both such fine and imprisonment in the discretion of the court.

Sec. 5. The board of inspectors of public school buildings shall have authority to employ assistants when necessary and to employ a sanitary engineer to enable it to perform promptly and accurately the duties required by this act. The said board shall be authorized to pay said sanitary engineer not to exceed ten dollars per day and traveling expenses for such time as may be necessary and said board and assistants when employed shall be entitled to necessary traveling expenses incurred while in the performance of the duties required by this act, said compensation and expenses to be allowed and paid by the board of state auditors in the same manner that the expenses of other officers are paid.

Sec. 6. All acts or parts of acts conflicting with the provisions of this act are hereby repealed.

SENATE BILL NO. 120, 1907.

A bill in relation to the prevention of the spread of dangerous communicable diseases, and the care of persons afflicted therewith.

*The People of the State of Michigan enact:*

SECTION 1. That whenever the health officer of any township, city or village in this State shall receive reliable notice or shall otherwise have good reason to believe that there is within the township, city or village of which he is the health officer, a case of smallpox, diphtheria, scarlet fever or other communicable disease dangerous to the public health, it shall be the duty of said health officer, unless he is or shall have been instructed by the board of health, of which he is an executive officer, to do otherwise, immediately to investigate the subject, and in behalf of the board of health, to order the prompt and thorough isolation of those sick or infected with such disease, so long as there is danger of their communicating the disease to other persons; to order the prompt vaccination or isolation of persons who have been exposed to smallpox; to see that no person suffers for lack of nurses or other necessaries because of isolation for the public good; to give public notice of infected places by placard on the premises, and otherwise if necessary; to promptly notify teachers or superintendents of schools concerning families in which are contagious diseases; to supervise funerals of persons dead from scarlet fever, diphtheria, smallpox, or other communicable disease which endangers the public health; to disinfect rooms, clothing and premises and all articles likely to be infected, before allowing their use by persons other than those in isolation; to keep the president of his own board of health constantly informed respecting every outbreak of a disease dangerous to the public health, and of the facts so far as the same shall come to his knowledge, respecting sources of danger of any such diseased person or infected article being brought into or taken out of the township, city or village of which he is the health officer; and the expenses incurred by the health officer in carrying out the provisions of this act shall be audited and paid out of the general fund by the proper authorities of the township, village or city where such expenses were incurred and such services were performed.

Sec. 2. When it shall be determined by the health officer, acting in accordance with the provisions of section 1 of this act, that any person is sick or infected with any dangerous communicable disease, and he shall determine that such person is in need of medical attention, nursing or other assistance, he shall forthwith notify either the supervisor of the township of the county or ward of

the city or the superintendents of the poor of the county in which such township, village or city is situated, and it shall be the duty of the superintendents of the poor of such county, when so notified, to furnish forthwith such medical attendance, nursing, or such other assistance as such person shall require; and the expense of furnishing such medical attendance, nursing and other assistance shall be paid by the county treasurer, upon the order of the superintendents of the poor of such county: Provided, If such person, his parents, or other person legally liable for his support, be able to pay for such medical attendance, nursing or other assistance, the said superintendents of the poor paying for such medical attendance, nursing or other assistance, as aforesaid, may, if the expense thereof is not paid, bring an action at law, in their own name, against such person or persons legally liable for their support, as aforesaid, in any court of competent jurisdiction, and recover the amount so paid, as aforesaid, together with the cost of prosecution and interest from the time of presenting the bill for such expense, which said money when collected shall be turned into the poor fund of said county.

SEC. 3. Act No. 7 of the Public Acts of 1903, and section 1 of Act No. 137 of the Public Acts of 1883, being section 4460 of the Compiled Laws of 1897, together with all acts or parts of acts contrary to the provisions of this act, are hereby repealed.

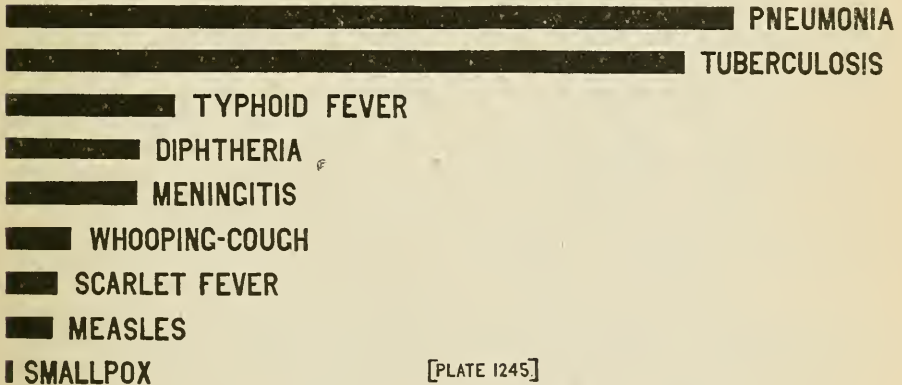
## PART II.

COMMUNICABLE DISEASES IN MICHIGAN DURING THE  
YEAR ENDING DECEMBER 31, 1906, AND IN  
PRECEDING YEARS.

## INTRODUCTION.

This article is the twenty-sixth in a series upon the same general subject, begun in 1882. It presents a summary of the compilation of the reports received from health officers relative to certain communicable diseases in Michigan during the year 1906, together with a review of some of the information obtained from similar compilations in preceding years. The most dangerous diseases are treated in detail in the order of their importance as causes of deaths, as shown by the diagram below:

## DEATHS IN MICHIGAN 9 YEARS, 1898-1906.



[PLATE 1245]

## SOME OF THE PURPOSES OF THIS COMPILATION.

In the law establishing the State Board of Health, the Secretary of the Board is required to collect information concerning vital statistics and knowledge respecting diseases, and to disseminate such information among the people. In compliance with this requirement, it is the

custom to collect, compile, tabulate and publish information relative to the causes, and methods of prevention and restriction, of the dangerous communicable diseases, under the following general heads: The General Prevalence of each disease; The Geographical Distribution of each disease; The Comparative Prevalence of each disease in Urban and Rural localities; The Reported Sources of Contagium of each disease; and The Restrictive and Preventive Measures in each disease. In the case of pneumonia, an effort is being made to learn the Period of Incubation of the disease. In the case of pneumonia, tuberculosis and meningitis, an effort is being made to show the Influence of Age and Sex, the Duration of Sickness, and the Seasonal Prevalence of each disease.

#### METHODS OF COMPILATION.

With the exception of pneumonia, tuberculosis, meningitis and typhoid fever, which have been studied by individual cases, the diseases have been compiled by *households*, instead of by *outbreaks* as in the past.

A *household* report is intended to include all the cases which occur in a house, or other place of abode, at or about the same time. When a period of over sixty days has elapsed since the last death or recovery in a household, should the disease reappear in the household and the source of contagium cannot be traced to the previous cases, a separate compilation is made of the subsequent cases. It will be seen, therefore, that it is quite possible for a particular disease to appear in the same household several times during any year and to be counted as one or as several households in the compilation, according to the circumstances attending the outbreaks.

#### GENERAL PLAN OF THE REPORTS.

Upon the receipt of information at this office that tuberculosis, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, meningitis, smallpox, German measles (rotheln), rabies or glanders, was present, or had recently been present, in any locality in the State, a letter was sent to the health officer, or, in his absence, to the president of the board of health, mentioning the reported existence of the disease within his jurisdiction, indicating his duties and powers, and the proper measures to be taken in restricting the disease, transmitting documents of instruction relative to the prevention and restriction of the disease for distribution among the neighbors of families in which the disease is present, and asking for reports relative to the methods employed for the restriction of the disease, the results of efforts for suppressing it, and the number of cases and deaths in each outbreak. With this letter, in each instance, except in the case of rabies and glanders, there was sent a sufficient number of blanks for the preliminary and final reports.

The information contained in the several reports, together with other correspondence relative to outbreaks of such diseases, are the bases on which the statements made in this article are founded.

## PNEUMONIA IN MICHIGAN IN 1906 AND PRECEDING YEARS.

Table 1 indicates that, in 1906, pneumonia was considerably more prevalent than in the preceding year and also more prevalent than the average for the two preceding years. It is believed, and with good reason, that, in each of the three years in which pneumonia has been reported, very many non-fatal cases of the disease were not reported to the local health officers and by them to this Department, and it is known that, as a rule, only the fatal cases were reported from a very large number of localities, particularly in the case of the more densely populated localities where pneumonia is usually the most prevalent. Notwithstanding the efforts put forth by this Department in the past two years for the proper recognition of the dangerous character of this disease, many physicians fail to recognize the necessity for reporting cases under their care to the local health officials. It usually happens that the first information of cases of pneumonia is received by this Department from the deaths returned to the Secretary of State, and by the time this Department has been able to notify the local health officials of the occurrence of the cases, it is too late for them to take the necessary measures for the restriction of the disease.

Pending a more general recognition of the fact of the communicability of pneumonia, local boards of health should require from physicians and householders reports relative to every case of this disease in their jurisdictions, and should take all precautions necessary for the restriction and prevention of the disease.

TABLE 1.—*The prevalence of pneumonia, in Michigan, in each of the three years, 1904-6.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 of the population.
1904.....	2,530,016	3,790	2,903	114.7
1905.....	2,557,275	3,227	2,636	103.1
1906.....	2,584,533	3,387	2,839	109.8
Annual averages.....	2,557,275	3,468	2,793	109.2

\*Estimated for intercensal years.

†From a large number of localities, only the fatal cases were reported, so that the figures in this column do not represent the numbers of cases which actually occurred.

## GEOGRAPHICAL DISTRIBUTION.

In the consideration of this phase of the study of pneumonia, the State was divided into eleven geographical divisions,\* the counties in each of which would be likely to have somewhat similar climatic conditions. Judging from the death rates of the several divisions, shown in Table 2, pneumonia was most prevalent in the Southeastern Division, Upper Peninsular Division and Western Division, and least prevalent in the Northeastern Division. Arranging the divisions in the order of greatest death rates per 100,000 of the population, we have the Southeastern (151.9), Upper Peninsula (112.2), Western (108.7), Southern Central (99.8), Central (99.4), Northwestern (95.0), Bay and Eastern (94.5), Northern Central (91.9), Northern (90.1), Southwestern (78.7), and Northeastern (75.6). The counties having the highest and lowest death rates were Roscommon (174.7) and Alcona (44.4). Compared with the average death rate for the State as a whole (109.2), the counties in which the disease was unusually prevalent during the three years, 1904-1906, are—Roscommon (174.7), Wayne (163.0), Delta (147.4), Houghton (144.9) and Lapeer (137.5).

\*The boundaries of the several divisions may be seen by reference to the annual report of the Michigan Department of Health for 1886, pages 201 and 217.



TABLE 2.—The geographical distribution of pneumonia, in Michigan, in the three years, 1904-1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.

Geographical Divisions.	Average.			
	Population.*	Cases. †	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	279,068	396	313	112.2
Alger county.....	6,702	8	7	104.4
Baraga county.....	5,300	5	5	94.3
Chippewa county.....	22,322	28	27	121.0
Delta county.....	27,822	44	41	147.4
Dickinson county.....	19,198	17	17	88.6
Gogebic county.....	17,437	18	16	91.8
Houghton county.....	71,766	140	104	144.9
Iron county.....	8,909	8	7	78.6
Keveeenaw county.....	4,878	13	5	102.5
Luce county.....	4,107	5	5	121.7
Mackinac county.....	8,383	7	5	59.6
Marquette county.....	39,703	52	36	90.7
Menominee county.....	26,320	28	25	95.0
Ontonagon county.....	7,408	13	6	81.0
Schoolcraft county.....	8,813	10	7	79.4
NORTHWESTERN DIVISION.	92,655	128	88	95.0
Benzie county.....	11,066	11	10	90.4
Grand Traverse county.....	23,883	28	19	79.6
Leelanau county.....	10,894	14	10	91.8
Manistee county.....	27,002	43	29	107.4
Wexford county.....	19,810	32	20	101.0
NORTHERN DIVISION.	87,673	110	79	90.1
Antrim county.....	15,427	20	18	116.7
Charlevoix county.....	16,859	18	10	59.3
Cheboygan county.....	17,691	24	17	96.1
Crawford county.....	4,082	5	3	73.5
Emmet county.....	18,382	23	17	92.5
Kalkaska county.....	7,727	9	7	90.6
Otsego county.....	7,505	11	7	93.3
NORTHEASTERN DIVISION.	66,174	64	50	75.6
Alcona county.....	9,015	7	4	44.4
Alpena county.....	20,122	17	16	79.5
Iosco county.....	10,614	6	6	56.5
Montmorency county.....	3,585	4	3	83.7
Ogemaw county.....	9,460	13	11	116.3
Oscoda county.....	1,993	6	2	100.4
Presque Isle county.....	11,385	11	8	70.3
WESTERN DIVISION.	282,363	361	307	108.7
Kent county.....	140,682	194	172	122.3
Lake county.....	5,010	3	3	59.9
Mason county.....	19,789	29	22	111.2
Muskegon county.....	37,457	52	44	117.5
Newaygo county.....	18,608	19	13	69.9
Oceana county.....	17,985	22	20	111.2
Ottawa county.....	42,832	42	33	77.0
NORTHERN CENTRAL DIVISION.	108,786	147	100	91.9
Clare county.....	9,396	13	7	74.5
Gladwin county.....	9,110	8	7	76.8
Isabella county.....	24,437	39	23	94.1
Mecosta county.....	20,097	28	22	109.5
Midland county.....	14,686	13	10	68.1
Missaukee county.....	10,506	11	10	95.2
Osceola county.....	18,837	26	18	95.6
Roscommon county.....	1,717	9	3	174.7

\* , †. These footnotes are below Table 1, on a preceding page.

TABLE 2.—CONCLUDED.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
<b>BAY AND EASTERN DIVISION.</b>	<b>349,352</b>	<b>413</b>	<b>330</b>	<b>94.5</b>
Arenac county.....	10,275	11	11	107.1
Bay county.....	63,716	71	60	94.2
Huron county.....	35,141	28	24	68.3
Lapeer county.....	26,902	55	37	137.5
Saginaw county.....	86,783	83	74	85.3
Sanilac county.....	34,820	41	31	89.0
St. Clair county.....	55,736	75	57	102.3
Tuscola county.....	35,979	49	36	100.1
<b>CENTRAL DIVISION.</b>	<b>315,993</b>	<b>426</b>	<b>314</b>	<b>99.4</b>
Barry county.....	21,903	29	23	105.0
Clinton county.....	25,226	34	19	75.3
Eaton county.....	30,466	52	39	128.0
Genesee county.....	42,990	64	52	121.0
Graziot county.....	30,698	38	31	101.0
Ingham county.....	44,554	62	40	89.8
Ionia county.....	34,702	50	37	106.6
Livingston county.....	18,395	21	16	87.0
Montcalm county.....	33,387	38	31	92.9
Shiawassee county.....	33,672	38	26	77.2
<b>SOUTHWESTERN DIVISION.</b>	<b>143,635</b>	<b>153</b>	<b>113</b>	<b>78.7</b>
Allegan county.....	38,982	37	29	74.4
Berrien county.....	49,446	46	34	68.8
Cass county.....	19,819	22	15	75.7
Van Buren county.....	35,388	48	35	98.9
<b>SOUTHERN CENTRAL DIVISION.</b>	<b>326,583</b>	<b>465</b>	<b>326</b>	<b>99.8</b>
Branch county.....	26,044	23	20	76.8
Calhoun county.....	53,875	75	56	103.9
Hillsdale county.....	29,830	34	25	83.8
Jackson county.....	46,847	98	53	113.1
Kalamazoo county.....	51,125	103	64	125.2
Lenawee county.....	49,270	57	45	91.3
St. Joseph county.....	23,063	21	20	86.7
Washtenaw county.....	46,529	54	43	92.4
<b>SOUTHEASTERN DIVISION.</b>	<b>508,342</b>	<b>808</b>	<b>772</b>	<b>151.9</b>
Macomb county.....	33,058	39	31	93.8
Monroe county.....	32,963	47	42	127.4
Oakland county.....	45,985	64	53	115.3
Wayne county.....	396,336	658	646	163.0

\* , †. These footnotes are below Table 1, on a preceding page.

#### LOCAL PREVALENCE.

Of the 1,639 incorporated localities in Michigan in 1906, 968, or about 59 per cent. were, at some time during the year, infected with pneumonia. As shown in Table 3 the greatest prevalence occurred in the cities and villages,—urban localities—the death rate being 127.0 per 100,000, as compared with 90.4 per 100,000 in the townships—rural localities. In the rural localities are included thirty-two villages, whose population cannot be correctly estimated. To determine what, if any, influence density of population had on the prevalence of pneumonia, the cities and villages have been divided into five groups, the death rate in each group being as follows: Cities over 50,000 population, 185.5 per 100,000; cities from 25,000 to 50,000, 108.7 per 100,000; cities (and Calumet

township) from 10,000 to 25,000, 104.9 per 100,000; cities and villages from 5,000 to 10,000, 111.0 per 100,000; and cities and villages under 5,000, 86.8 per 100,000. By this it may be seen that the death rate was very much higher in cities over 50,000, and the lowest in cities and villages under 5,000 population.

As indicated by the death rates, the larger localities in which pneumonia was much more prevalent than the average for the entire State in 1906 (109.8 per 100,000 of the population) were: Wyandotte (with a death rate of 342.6 per 100,000), Detroit (208.1), Hancock (199.1), Mt. Clemens (189.9), Cheboygan (189.8), Escanaba (176.9), Muskegon (152.8), Calumet Township (145.4), Iron Mountain (145.3), Menominee (136.7) and Bay City (130.6).

TABLE 3.—*The prevalence of pneumonia in urban and rural localities, in Michigan, in 1906.*

Localities—Grouped according to density of population.	Population.*	Health jurisdictions.			Cases. †	Deaths.	Death rates per 100,000 of the population.
		Infected.					
		Total.	Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	440,984	2	2	100	841	818	185.5
Cities from 25,000 to 50,000.....	147,162	4	4	100	212	160	108.7
Cities from 10,000 to 25,000 and Calumet Twp (17,885).....	261,286	18	18	100	336	274	104.9
Cities and villages from 5,000 to 10,000‡.....	153,187	24	24	100	204	170	111.0
Cities and villages under 5,000‡.....	369,743	337	229	68	423	321	86.8
Total urban.....	1,372,362	385	277	72	2,016	1,743	127.0
Balance of localities—principally townships§.....	1,212,171	1,254	691	55	1,371	1,096	90.4

\*†These footnotes are below Table 1, on a preceding page.

‡Exclusive of thirty-two villages in the two groups, for which the population in 1906 cannot be correctly estimated.

§Includes the thirty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

#### SEASONAL PREVALENCE.

Judging from the average numbers of persons who were taken sick in each month in the three years, 1904-1906, shown in Table 4, pneumonia was most prevalent in the month of February, and least prevalent in the month of August.

By the Secretary of State's Vital Statistics of Michigan, it appears that during the nine years, 1898-1906, the greatest number of deaths from pneumonia occurred in the months of February and March, and the smallest number in August.

The months of greatest prevalence of pneumonia are from December to May, both inclusive.

TABLE 4.—*The seasonal prevalence of pneumonia, in Michigan, as indicated by the average number of persons taken sick in each month in the three years, 1904-1906, and by the average number of deaths, from this disease, in each month in the nine years, 1898-1906.*

Years.		Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904-1906.	Average number of persons taken sick in each month*	438	478	393	318	252	103	75	50	83	132	220	322
1898-1906.	Average number of deaths in each month†.....	338	389	382	314	233	117	71	61	77	115	173	255

\* The months in which some of the cases began were not reported.

† The averages for the years 1898-1903 are compiled from the Secretary of State's Vital Statistics of Michigan, and for the three years, 1904-1906, from the Michigan Monthly Bulletin of Vital Statistics.

#### INFLUENCE OF AGE AND SEX, 1904-1906.

The ages of those taken sick with pneumonia in the three years, 1904-1906, were stated in 10,089 instances.

In the case of those who died from pneumonia, the ages were stated in 8,235 instances, and of this number, nearly 25 per cent were under one year; nearly 39 per cent under 5 years; nearly 10 per cent between the ages of five and twenty-four years; nearly 16 per cent between the ages of twenty-five and forty-nine years; 24 per cent between the ages of fifty and seventy-four years; and 12 per cent 75 years and over.

The numbers and per cents of cases and deaths, by one year periods from 0 to 5 years, and by five year periods from 5 to 75 years, are contained in Table 5.

The average age of non-fatal cases was for males 25.9 years, and for females 28.4 years.

The average age of fatal cases was for males 30.8 years, and for females 33.2 years.

Thirty-nine per cent of the males and 38 per cent of the females who died, and 17 per cent of the males and 19 per cent of the females who recovered, were under five years of age.

Ten per cent of the males and 14 per cent of the females who died, and 2 per cent of the males and 3 per cent of the females who recovered, were over 74 years of age.

Up to the second year, and between the ages of 15 and 64 years, inclusive, the fatality was slightly higher in the males than in the females. Up to the second year, and between the ages of 4 and 59 years, inclusive, the recoveries were more numerous in the males than in the females.

TABLE 5.—*The influence of age and sex in pneumonia, as indicated by the numbers of those OF KNOWN AGES, who died or recovered from this disease in the three years, 1904-1906. Arranged, by sex, in age periods of one year for those of from one to five years; in five year periods for those of from five to seventy-five years; and in one group for those of seventy-five years and over.*

Age periods.	Died.									Recovered.					
	Total deaths.			Per cent of deaths.			Average deaths per year.			Total recoveries.			Average recoveries per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
0-1 year.....	1,173	867	2,040	14.25	10.52	24.77	391	289	680	44	34	78	15	11	26
1-2 years.....	365	314	679	4.43	3.82	8.25	122	105	227	40	33	73	13	11	24
2-3 years.....	113	115	228	1.37	1.40	2.77	38	38	76	31	37	68	10	12	22
3-4 years.....	60	74	134	.73	.90	1.63	20	25	45	39	31	70	13	10	23
4-5 years.....	41	54	95	.50	.66	1.16	14	18	32	26	14	40	9	5	14
Under 5 years.....	1,752	1,424	3,176	21.28	17.29	38.57	584	475	1,059	180	149	329	60	50	110
5-9 years.....	106	108	214	1.29	1.31	2.60	35	36	71	127	106	233	42	35	77
10-14 years.....	48	71	119	.58	.86	1.44	16	24	40	88	67	155	29	22	51
15-19 years.....	125	88	213	1.52	1.07	2.59	42	29	71	121	46	167	40	15	55
20-24 years.....	142	106	248	1.72	1.29	3.01	47	35	82	84	39	123	28	13	41
25-29 years.....	121	103	224	1.47	1.25	2.72	40	34	74	53	32	85	18	11	29
30-34 years.....	160	101	261	1.94	1.23	3.17	53	34	87	53	40	93	18	13	31
35-39 years.....	138	108	246	1.68	1.31	2.99	46	36	82	66	38	104	22	13	35
40-44 years.....	189	110	299	2.29	1.34	3.63	63	37	100	59	41	100	20	14	34
45-49 years.....	183	99	282	2.22	1.19	3.41	61	33	94	56	51	107	19	17	36
50-54 years.....	185	103	288	2.25	1.25	3.50	62	34	96	50	34	84	17	11	28
55-59 years.....	212	149	361	2.57	1.81	4.38	71	50	121	31	26	57	10	9	19
60-64 years.....	199	197	396	2.42	2.39	4.81	66	66	132	25	38	63	8	13	21
65-69 years.....	219	226	445	2.66	2.74	5.40	73	75	148	22	34	56	7	11	18
70-74 years.....	242	252	494	2.94	3.06	6.00	81	84	165	26	25	51	9	8	17
75 years and over.....	442	527	969	5.37	6.40	11.77	147	176	323	22	25	47	7	8	15
All ages.....	4,463	3,772	8,235	54.20	45.80	100.00	1,488	1,257	2,745	1063	791	1854	354	264	618

## DURATION OF FATAL AND NON-FATAL CASES, 1904-1906.

The average duration of fatal cases was for males 8.6 days, and for females 8.8 days.

The average duration of non-fatal cases was for males 18.0 days, and for females 18.1 days.

Of the fatal cases, the greatest numbers of deaths, both male and female, occurred between the first and eleventh days; the next greatest number, before the sixteenth day, and the next, before the twenty-first day.

Of the non-fatal cases, the greatest number of recoveries, both male and female, took place between the tenth and twenty-first days.

The per cents of deaths and recoveries, both male and female, in five day periods, are shown in Table 6.

TABLE 6.—*The duration of sickness in fatal and non-fatal cases of pneumonia, OF KNOWN DURATION, during the three years, 1904-1906. Arranged, by sex, in 5 day periods.*

Duration periods.	Fatal cases.						Non-fatal cases.					
	Numbers.			Per cent.			Numbers.			Per cent.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 to 5 days.....	1,410	1,142	2,552	21.32	17.27	38.59	19	18	37	1.22	1.14	2.36
6 to 10 days.....	1,265	1,155	2,420	19.12	17.46	36.58	148	98	246	9.40	6.22	15.62
11 to 15 days.....	445	351	796	6.73	5.31	12.04	230	166	396	14.60	10.54	25.14
16 to 20 days.....	164	140	304	2.48	2.12	4.60	189	152	341	12.00	9.65	21.65
21 to 25 days.....	87	97	184	1.32	1.46	2.78	129	110	239	8.19	6.98	15.17
26 to 30 days.....	57	49	106	.86	.74	1.60	52	52	104	3.30	3.30	6.60
31 days and over.....	139	113	252	2.10	1.71	3.81	131	81	212	8.32	5.14	13.46
Totals.....	3,567	3,047	6,614	53.93	46.07	100.00	898	677	1,575	57.03	42.97	100.00

## PREDISPOSING INFLUENCES, 1904-1906.

In reply to the question, "What sickness or other predisposing influence preceded this case?" 2,386 cases were reported as having followed a cold; 391 cases following influenza; 321 cases following bronchitis, and 273 cases following exposure to inclement weather.

These, and other predisposing influences, are shown in Table 7, and this table may well be studied in connection with Table 8, on a subsequent page.

TABLE 7.—*Predisposing influences in pneumonia, as indicated by the manner in which the disease was reported to have begun IN SOME OF THE CASES in the years 1904-1906.*

Disease began as or followed.	Number of instances.	Disease began as or followed.	Number of instances.
Cold.....	2,386	Malarial fever.....	5
Influenza.....	391	Teething.....	5
Bronchitis.....	321	Peritonitis.....	5
Exposure to inclement weather.....	273	Erysipelas.....	4
Whooping-cough.....	128	Insanitary conditions.....	4
Measles.....	124	Neutral insufficiency.....	4
Heart disease.....	52	Marasmus.....	4
Pleurisy.....	44	Operation.....	3
Senility.....	38	Appendicitis.....	3
Asthma.....	37	Cholera infantum.....	3
Alcoholism.....	25	Miscarriage.....	3
General debility.....	24	Syphilis.....	3
Traumatism.....	23	Epilepsy.....	3
Meningitis.....	22	Softening of brain.....	3
Tuberculosis.....	19	Jaundice.....	2
Confinement.....	19	Non-acclimated.....	2
Bowel trouble.....	16	Dropsy.....	2
Nephritis.....	15	Morphine habit.....	2
Tonsillitis.....	15	Uremia.....	2
Paralysis.....	14	Cancer.....	2
Convulsions.....	12	Dust on lungs.....	2
Gastro enteritis.....	12	Diabetes.....	2
Mal-nutrition.....	12	Spinal trouble.....	2
Typhoid fever.....	10	Catarrhal fever.....	2
Rheumatism.....	10	Adenoids.....	1
Kidney trouble.....	10	Mumps.....	1
Throat trouble.....	8	Atmospheric conditions.....	1
Abscess.....	7	Eczema.....	1
Stomach trouble.....	7	Scarlet fever.....	1
Lung trouble.....	7	Chicken-pox.....	1
Sepsis.....	6	Indigestion.....	1
Liver trouble.....	6	Anesthesia.....	1
Sporadic.....	5	Change of life.....	1
Croup.....	5	Strangulation of hernia.....	1
Diphtheria.....	5	Premature birth.....	1
Hemorrhage of lungs.....	5	Eye trouble.....	1
Apoplexy.....	5	Smoking.....	1
Anemia.....	5	Eclampsia.....	1

## REPORTED SOURCES OF CONTAGIUM, 1904-6.

By reason of the difficulty met with in tracing cases of pneumonia to their source, the information contained in the reports of health officers relative to the sources of contagium in this disease is very meagre.

Of the 106 cases in which a source was given, 94 were reported as having been contracted while nursing, or otherwise coming in contact with, pneumonia patients.

Other reported sources of contagium are shown in Table 8, and this table may well be studied in connection with Table 7, on a preceding page.

TABLE 8.—*Reported sources of contagium in pneumonia, in Michigan, in the three years, 1904-1906.*

Sources.	Number of instances.
Traced to former cases in same jurisdiction.....	94
From outside jurisdictions.....	8
Foreign bodies in bronchial tubes.....	3
Handling mail.....	1
Not stated, or statements doubtful.....	10,298

## PERIOD OF INCUBATION, 1904-6.

By reason of the difficulty experienced in locating individual sources of contagium and, by this means, the time of exposure to pneumonia, the period of incubation is not easy to determine. As indicating the probable average period of incubation in the three years, 1904-1906, it may be stated that, in the majority of instances, the time which elapsed between certain cases and recent previous cases in the same households was from one to eight days, the maximum number of cases having occurred on the fourth day.

The periods of time which elapsed between the occurrence of one hundred and seventy-six cases of pneumonia and previous cases in the same households, in the years 1904-1906, is shown in Table 9. The table may also be of service in studying the questions of *communicability* in pneumonia and the *susceptibility*, to future attacks, of persons who have once had the disease.



TABLE 9.—The COMMUNICABILITY of pneumonia as probably indicated by the number of contemporary cases in the same households; the PERIOD OF INCUBATION in pneumonia, as probably indicated by the time which elapsed between the occurrence of certain cases of this disease and recent previous cases in the same household; and the SUSCEPTIBILITY of certain persons to pneumonia, as probably indicated by the numbers of instances in which second, and even third, attacks occurred in the same persons, in Michigan, in the three years, 1904-1906.

Time of occurrence of secondary cases in the same household.	Number of instances.	Time of occurrence of secondary cases in the same household.	Number of instances.
About same time.....	18	Twenty-three days.....	1
Twelve hours.....	1	Twenty-four days.....	1
One day.....	6	Twenty-seven days.....	1
Two days.....	9	One month.....	9
Three days.....	6	One month and 15 days.....	2
Four days.....	10	Two months.....	3
Five days.....	5	Three months.....	5
Six days.....	6	Four months.....	3
Seven days.....	9	Five months.....	1
Eight days.....	5	Seven months.....	1
Nine days.....	2	Eight months.....	1
Ten days.....	2	Eleven months.....	1
Eleven days.....	3	One year.....	* 24
Twelve days.....	1	One year and 7 months.....	† 3
Thirteen days.....	1	Two years.....	‡ 11
Fourteen days.....	1	Three years.....	8
Sixteen days.....	1	Three years and 6 months.....	1
Nineteen days.....	2	Four years.....	2
Twenty-one days.....	2	Five years.....	§ 7
Twenty-two days.....	1	Time not stated.....	46

\* In three instances, a second attack in the same person

† In one instance, a second attack in the same person.

‡ In three instances, a second attack in the same person.

§ In one instance, a second attack, and in another instance, a third attack, in the same person, in the five years.

#### INFLUENCE OF OCCUPATION, 1904-1906.

The occupations of pneumonia patients in the three years, 1904-1906, were given in 4,228 instances, and of this number, at least 3,800 were engaged in occupations which, it is believed, exposed them, or rendered them susceptible, to this disease.

Heading the list are those engaged in housework—housewives, housekeepers and domestics—to the number of 1,548, many of whom spend a considerable portion of their time in ill ventilated and dust laden rooms. Dirt—often contaminated with infected sputum—carried into the home on the shoes and skirts, and disseminated throughout the rooms by air currents, or by the periodical sweeping and dusting, is generally

believed to play a very important part in the spread of pneumonia, and other diseases of the respiratory organs.

Next in order are the farming class, to the number of 958, who, though naturally a hardy race, and living under conditions which tend to health and vigor, seem to be very susceptible to this disease.

Next in order are the laboring class, with 526 cases; and next to them the student class—principally young children of school age—with 277 cases.

In the two years, 1905 and 1906, there were 2,241 cases where the ages of the patients were given as under 5 years, therefore no occupation was given, and they were still too young to attend school, so could not be included in the student class.

A complete list of the occupations of pneumonia patients, as reported in the three years, 1904-1906, may be found in Table 10.

TABLE 10.—*The influence of occupation in pneumonia, in the three years, 1904-1906.*

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housewife.....	1,548	Sailor.....	9	Cattle buyer.....	2
Farmer.....	958	Night watchman.....	9	Soldier.....	2
Laborer.....	526	Cigarmaker.....	8	Surface foreman.....	2
Student.....	277	Legal profession.....	8	Engineer and surveyor.....	2
Mechanic.....	167	Printer.....	8	Messenger.....	2
Merchant.....	107	Janitor.....	7	Veterinarian.....	2
Miner.....	50	Liveryman.....	7	Laundryman.....	1
Teamster.....	50	Harnessmaker.....	7	Woodworker.....	1
Office clerk.....	48	Tinner.....	7	Butter maker.....	1
Store clerk.....	43	Hotel keeper.....	6	Bean picker.....	1
Railroad man.....	34	Tailor.....	6	Stone cutter.....	1
Painter and paperhanger.....	31	Butcher.....	6	Well digger.....	1
School teacher.....	26	Barber.....	5	Theatrical man.....	1
Agent.....	23	Washerwoman.....	5	Bookbinder.....	1
Woodsmen.....	23	Policeman.....	5	Architect.....	1
Minister.....	18	Musician.....	5	Baker.....	1
Factory employe.....	15	Milliner.....	4	Carpet weaver.....	1
Dressmaker and seamstress.....	14	Hotel porter.....	4	Elevator boy.....	1
Gardener or florist.....	13	Street car conductor.....	3	Hair dresser.....	1
Lumberman.....	12	Fisherman.....	3	Inspector.....	1
Cook.....	12	Marine engineer.....	3	Plasterer.....	1
Contractor.....	12	Waiter.....	3	Upholsterer.....	1
Nurse.....	11	Mail carrier.....	3	Lineman.....	1
Shoemaker.....	11	Real estate man.....	2	Nun.....	1
Miller.....	11	Attendant in prison or asylum.....	2	Not stated, or statements doubtful.....	6,176
Bartender.....	11	Dentist.....	2		
Physician.....	10				

## RESTRICTIVE AND PREVENTIVE MEASURES, 1904-1906.

By reference to Table 11, it will be seen that, of the total number of cases of pneumonia in the three years, 1904-1906, but 2,391, or 23 per cent, were isolated from all persons except nurses and attending physicians; that in 3,537 instances, or 35 per cent of the whole number, the sputa was disinfected; and that in 4,137 instances, or 40 per cent of the whole number, the rooms occupied by pneumonia patients were disinfected.

As previously stated, in a large number of instances, this Department received its first information of cases of pneumonia through the death returns and, in many instances, the health officials had no knowledge of these cases until notified of the same by this Department. It was then too late to carry out the usual restrictive and preventive measures, and this fact will account, to a considerable extent, for the comparatively small number of cases in which precautions were taken.

In the consideration of measures for the prevention of pneumonia, it is suggested that a vast amount of good may be accomplished along this line by the Press, particularly at the time when pneumonia is usually most prevalent, in the publication of articles such as that which follows and which was clipped from the *Saginaw Courier Herald*:

### GUARD AGAINST PNEUMONIA.

Pneumonia is now classed among the epidemic diseases, and is far more deadly in its ravages in the State of Michigan than any other disease. Pneumonia is most fatal to children and old people, although it causes a considerable amount of sickness and of mortality to persons in the prime of life. The average number of deaths per annum in Michigan from this cause is placed by the State Board of Health at 2,793. Science has traced out the microbe, the "pneumococcus," which is the source of the infection, and has marked out clearly the course of the disease pathologically. Although careful scientific investigation has thrown much added light on the disease the medical fraternity is yet unable to tell why the disease is more actively violent in some seasons than in others.

A weakened and susceptible state of the patient is most liable to induce infection in time of exposure, a condition true of most infectious maladies, but especially true of pneumonia. The disease is also quite apt to appear in persons weakened by dissipation or insufficient nutrition, who are badly clothed, or who lived in close, ill-ventilated quarters. Although specially favored by such conditions, pneumonia also frequently occurs in homes where the best and most sanitary surroundings obtain. In such circumstances it frequently follows the grip and the many catarrhal affections.

For this reason too great care cannot be taken by patients recovering from the grip or those suffering from severe colds. Each year pneumonia claims 100,000 victims in the United States, and little can be done to cure the disease when once contracted. In this case an ounce of prevention is worth tons of cure, for prevention appears to be the only way to reduce its ravages. For this the best means are to attend properly to suitable nutrition by eating the most wholesome foods, by living in a correct and healthful manner and by taking care of the little ills before they leave one in a state to contract more dangerous maladies.

TABLE 11.—*Restrictive and preventive measures in pneumonia, in Michigan, in the three years, 1904-1906.*

Restrictive and preventive measures.	Number of cases.	Per cent.
<b>ISOLATION:</b>		
Enforced.....	2,391	23
Neglected.....	3,060	29
Not stated, or statements doubtful.....	4,953	48
<b>DISINFECTION OF SPUTA:</b>		
Enforced.....	3,537	* 35
Neglected.....	1,271	* 13
Not stated, or statements doubtful.....	5,276	* 52
<b>DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:</b>		
Enforced.....	4,496	* 45
Neglected.....	1,421	* 14
Not stated, or statements doubtful.....	4,167	* 41
<b>DISINFECTION OF ROOM OCCUPIED BY PATIENT:</b>		
Enforced.....	4,137	40
Neglected.....	2,581	23
Not stated, or statements doubtful.....	3,886	37

\* In 320 instances, the reports stated that there was no sputa, therefore this number has been deducted from the total number of cases before making the per cent.

## TUBERCULOSIS IN MICHIGAN IN 1906 AND PRECEDING YEARS.

### GENERAL PREVALENCE.

During the year 1906, tuberculosis was reported present at 846 incorporated health jurisdictions in this State, with an aggregate of 2,653 cases, including 2,502 deaths.

The word "cases," as used in this article, includes only the cases of which this Department received the first report, during any one year, and is not intended to include the actual number of cases which began or were present in any year.

There were still sick at the close of the year 419 persons, of whose sickness information had been received by this Department from time to time during the year. There were also a number of persons still sick at various times during the year, but of whom the Department received no information at the close of the year. Some of them may have recovered prior to December 31.

By reason of the fact that many cases of this disease are of long

duration, and in some stages of the disease not under the care of a physician, the number of reports received by this Department are believed to be considerably less than the actual number of cases which occurred.

From many localities, only the deaths from tuberculosis are reported, therefore the apparent rates of deaths to cases are much too high.

In this article, the deaths reported to the Secretary of State are used in the several tables in conjunction with those reported to this Department.

The compilation of information relative to the prevalence of tuberculosis in Michigan was made for the first time in 1893, but from that time to 1898, when the new law for the registration of deaths took effect, the reports were much less than the actual numbers of cases and deaths which occurred. Hence the reason for commencing Table 12 with the year 1898.

The number of deaths from pulmonary tuberculosis per 100,000 persons living, reported to the Secretary of State during the twenty-nine years, ending with 1897 (Table 13), probably quite accurately represents the annual fluctuations of, but not the total deaths from, this disease. It may be seen that, compared with any previous year, there was a remarkable and unprecedented decrease in the death rate from this disease in 1891, and the decrease occurred at a time when influenza was epidemic in the country. Statistics for the Eastern States at that time showed an increase in the death rates from tuberculosis, which increase was attributed to the influence of the epidemic influenza.

The decrease in tuberculosis in Michigan has apparently resulted from the education of the people to a knowledge that tuberculosis is a dangerous communicable disease, which may easily be restricted. It is one more forcible illustration of the fact that "Knowledge is Power." Knowledge of the modes whereby tuberculosis is usually spread, and of the ease with which its spread may be lessened, by the destruction or disinfection of all infected sputa, has apparently supplied a "power" which has caused an unprecedented reduction in the death rate from tuberculosis. The extent of the "campaign of education" which, in Michigan, began in 1880, and which took on an especially vigorous activity in 1891, can hardly be realized without a study of its history; but the apparent results of that educational movement are exceedingly plain to be seen from Table 13.

Some of the reasons for believing that the decrease in the death rate from tuberculosis has been due to the popular education in the way the disease is usually spread, and in the way to restrict the disease are: 1. The disease was under observation for many years before that knowledge became general, and (as shown by Table 13) it did not decrease; the decrease has been nearly coincident with the education, lagging behind somewhat at the outset, and gradually increasing later, as it would be expected to do if caused by the popular education. 2. Precisely similar decrease occurred in Michigan in the death rate from scarlet fever and from other diseases, coincident with systematic popular education in the ways those diseases are usually spread, and in the best measures for their restriction. 3. The decrease in the mortality from tuberculosis has, apparently, been greatest in those States where systematic popular education for its restriction has been most general and

active. 4. There is no other known cause capable of producing such a gradually increasing effect as is shown to have occurred.

TABLE 12.—*The prevalence of tuberculosis, in Michigan, in each of the nine years, 1898–1906.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 population.
1898.....	2,389,393	3,041	2,728	114.2
1899.....	2,426,331	2,975	2,516	103.7
1900.....	2,420,982	2,721	2,221	91.7
1901.....	2,448,241	2,915	2,344	95.7
1902.....	2,475,499	2,658	2,185	88.3
1903.....	2,502,758	2,745	2,319	92.7
1904.....	2,530,016	2,928	2,515	99.4
1905.....	2,557,275	2,590	2,464	96.4
1906.....	2,584,533	2,653	2,502	96.8
Averages per year.....	2,481,670	2,803	2,422	97.6

\* Estimated for intercensal years.

† From Detroit, and many other localities, only the fatal cases were reported, so that the figures in this column do not represent the number of cases which actually occurred.

TABLE 13.—*The number of reported deaths from tuberculosis of the lungs per 100,000 persons living, in Michigan, in each of the twenty-nine years, 1869–1897. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths.....	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7
Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths.....	116.1	104.4	112.3	120.8	105.3	107.3	108.7	121.0	104.3	105.4	96.3	95.2
Year.	1893.	1894.	1895.	1896.	1897.	Average, 1869–1897.						
Deaths.....	97.7	98.4	105.1	90.4	80.6	106.2						

#### GEOGRAPHICAL DISTRIBUTION OF TUBERCULOSIS IN THE NINE YEARS, 1898–1906.

By Table 14 it may be seen that, as indicated by the average death rates for the entire State (shown in Table 12), the disease was much more prevalent than the average in the counties of Mackinac, Grand Traverse, Wayne and Roscommon.

In a lesser degree, the disease was more prevalent than the average in the counties of Luce, Baraga, Houghton, Delta, Benzie, Macomb, Leelanau, Marquette, Kent, Kalamazoo, Alcona, St. Joseph, Keweenaw and Ionia.

TABLE 14.—*The geographical distribution of tuberculosis, in Michigan, in the nine years, 1898–1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division, shown in the table.*

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	264,394	332	269	101.7
Alger county.....	6,098	5	3	49.2
Baraga county.....	5,057	6	6	118.6
Chippewa county.....	21,286	22	21	98.7
Delta county.....	25,677	37	29	112.9
Dickinson county.....	17,978	18	17	94.6
Gogebic county.....	16,703	14	13	77.8
Houghton county.....	66,057	106	78	118.1
Iron county.....	8,746	8	5	57.2
Keweenaw county.....	3,845	4	4	104.0
Luce county.....	3,340	4	4	119.8
Mackinac county.....	7,769	12	12	154.5
Marquette county.....	40,286	56	44	109.2
Menominee county.....	26,274	22	21	79.9
Ontonagon county.....	6,800	11	6	88.2
Schoolcraft county.....	8,478	7	6	70.8
NORTHWESTERN DIVISION.	89,814	116	92	102.4
Benzie county.....	10,676	13	12	112.4
Grand Traverse county.....	22,449	41	28	124.7
Leelanau county.....	10,849	13	12	110.6
Manistee county.....	27,541	31	26	94.4
Wexford county.....	18,299	18	14	76.5
NORTHERN DIVISION.	80,822	80	68	84.1
Antrim county.....	15,619	15	12	76.8
Charlevoix county.....	15,004	17	14	93.3
Cheboygan county.....	16,650	15	14	84.1
Crawford county.....	3,353	3	2	59.6
Emmet county.....	16,379	19	16	97.7
Kalkaska county.....	7,198	7	6	83.4
Otsego county.....	6,619	4	4	60.4
NORTHEASTERN DIVISION.	58,327	47	43	73.7
Alcona county.....	5,628	6	6	106.6
Alpena county.....	19,540	15	14	71.6
Iosco county.....	10,162	9	8	78.7
Montmorency county.....	3,459	3	3	86.7
Ogemaw county.....	8,097	7	6	74.1
Oscoda county.....	1,764	2	1	56.7
Presque Isle county.....	9,677	5	5	51.7
WESTERN DIVISION.	275,008	326	275	100.0
Kent county.....	136,108	180	147	108.0
Lake county.....	5,039	5	5	99.2
Mason county.....	19,713	23	20	101.5
Muskegon county.....	36,624	45	37	101.0
Newaygo county.....	18,094	14	13	71.8
Oceana county.....	17,435	15	14	80.1
Ottawa county.....	41,945	44	39	93.0
NORTHERN CENTRAL DIVISION.	105,859	96	82	77.5
Clare county.....	8,863	7	6	67.7
Gladwin county.....	7,556	6	5	66.2
Isabella county.....	23,920	24	19	79.4
Mecosta county.....	20,681	20	18	87.0
Midland county.....	14,923	13	12	80.4
Missaukee county.....	9,821	5	5	50.9
Osceola county.....	18,464	19	15	81.2
Rosecommon county.....	1,631	2	2	122.6

\*† These footnotes are below Table 12.

TABLE 14.—CONCLUDED.

Geographical Divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
<b>BAY AND EASTERN DIVISION.</b>	346,647	318	290	83.7
Arenac county.....	9,708	6	5	51.5
Bay county.....	63,987	64	60	93.8
Huron county.....	35,123	30	27	76.9
Lapeer county.....	27,488	24	21	76.4
Saginaw county.....	83,850	78	73	87.1
Sanilac county.....	35,038	35	31	88.5
St. Clair county.....	55,374	46	41	74.0
Tuscola county.....	36,079	35	32	89.7
<b>CENTRAL DIVISION.</b>	316,220	339	284	89.8
Barry county.....	22,471	22	17	75.7
Clinton county.....	25,366	24	21	82.8
Eaton county.....	31,449	36	30	95.4
Genesee county.....	42,360	49	40	94.4
Gratiot county.....	30,046	32	28	93.2
Ingham county.....	42,505	40	32	75.3
Ionia county.....	35,117	42	36	102.5
Livingston county.....	19,138	21	17	88.8
Montcalm county.....	33,742	32	29	85.9
Shiawassee county.....	34,026	41	34	99.9
<b>SOUTHWESTERN DIVISION.</b>	143,034	156	135	94.4
Allegan county.....	39,032	42	36	92.2
Berrien county.....	49,599	54	49	93.8
Cass county.....	20,505	24	19	92.7
Van Buren county.....	33,898	36	31	91.5
<b>SOUTHERN CENTRAL DIVISION.</b>	322,749	383	312	96.7
Branch county.....	26,484	30	25	94.4
Calhoun county.....	52,026	55	51	98.0
Hillsdale county.....	29,842	33	28	93.8
Jackson county.....	47,581	43	43	90.4
Kalamazoo county.....	47,685	80	51	107.0
Lenawee county.....	48,862	47	42	86.0
St. Joseph county.....	23,703	30	25	105.5
Washtenaw county.....	46,566	65	47	100.9
<b>SOUTHEASTERN DIVISION.</b>	478,801	601	570	119.0
Macomb county.....	33,110	42	37	111.7
Monroe county.....	33,157	39	33	99.5
Oakland county.....	45,236	54	43	95.1
Wayne county.....	367,298	466	457	124.4

\* † These footnotes are below Table 12.

#### THE PREVALENCE OF TUBERCULOSIS IN URBAN AND RURAL LOCALITIES.

By reference to Table 15, it may be seen that, as indicated by the death rates, tuberculosis was most prevalent in the large centers of population, particularly in cities of 50,000 inhabitants, and over, and in localities of from 10,000 to 25,000 inhabitants. It may also be seen that the death rates were higher in all urban localities than the death rate for the entire State, shown in Table 12.

As indicated by the death rates, the localities in which tuberculosis was much more prevalent in 1906 than the rate for the entire State for that year were: Hancock (241.8), Traverse City (238.6), Pontiac (166.1), Calumet township (162.1), Kalamazoo (160.1), Escanaba (160.0), Iron Mountain (157.5), Ionia (153.0), Manistee (150.9), Ann



Arbor (150.2), Marquette (136.7), Mt. Clemens (135.6), Negaunee (133.8), Benton Harbor (132.9), Muskegon (129.0), Flint (126.8), Sault Ste. Marie (126.1) and Detroit (123.7).

TABLE 15.—*The prevalence of tuberculosis in urban and rural localities, in Michigan, in 1906.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases †	Deaths.	Death rates per 100,000 of the population.
		Infected.					
		Total.	Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	440,984	2	2	100	540	514	116.6
Cities from 25,000 to 50,000.....	147,162	4	4	100	196	160	108.7
Cities from 10,000 to 25,000, and Calumet township (17,885).....	261,286	13	13	100	338	301	115.2
Cities and villages from 5,000 to 10,000‡.....	153,187	24	23	96	169	156	101.8
Cities and villages under 5,000‡.....	369,743	337	139	56	393	385	104.1
Total urban.....	1,372,362	385	236	61	1,636	1,516	110.5
Balance of localities—principally townships§.....	1,212,171	1,254	610	49	1,017	936	81.3

\*† These footnotes are below Table 12, on a preceding page.

‡ Exclusive of thirty-two villages in the two groups, for which the populations in 1906 cannot be correctly estimated.

§ Includes the thirty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

#### THE SEASONAL FATALITY OF TUBERCULOSIS.

As a rule, tuberculosis in the early stages is not recognized, and consequently the time of its inception is not generally known or reported. This, coupled with the fact that regular reports of the progress of many cases are lacking, renders it difficult to determine, with any degree of accuracy, the seasonal prevalence of the disease. Table 16 is therefore designed to take the place of a table showing the seasonal prevalence. The months of greatest fatality, named in the order of greatest numbers of deaths, were April, May, March and December; the months of least fatality being from June to September, inclusive.

TABLE 16.—*The seasonal fatality from tuberculosis, in Michigan, as shown by the average number of deaths from this disease in each month in the thirteen years, 1894–1906.*

Months.....	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average numbers of deaths.....	157	154	170	176	174	146	137	141	139	155	148	163

## LOCATION OF THE DISEASE IN TUBERCULOSIS.

Table 17 shows that for a period of twelve years, ending in 1906, the disease was located in the lungs in nearly six times as many instances as in all the other organs of the body combined. Usually the disease was located in more than one part of the body, in many instances in several different organs or parts at the same time.

TABLE 17.—*Location of the disease in tuberculous persons, in Michigan, during the twelve years, 1895-1906.*

Part of the body.	No. of instances.*	Part of the body.	No. of instances.*	Part of the body.	No. of instances.*
Abdomen.....	54	Iliac.....	2	Pharynx.....	6
Alimentary canal.....	4	Inguinal.....	1	Pleura.....	15
Ankle.....	6	Intestines.....	180	Rectum.....	12
Arm.....	2	Joints.....	6	Respiratory organs.....	4
Back.....	5	Kidneys.....	70	Ribs.....	2
Bladder.....	21	Knee.....	19	Shoulder.....	3
Blood.....	8	Larynx.....	182	Side.....	12
Bones.....	9	Leg.....	7	Skin.....	4
Bowels.....	740	Liver.....	68	Spine.....	42
Brain.....	34	Lungs.....	16,212	Spleen.....	6
Breast.....	2	Lymph system.....	11	Stomach.....	178
Bronchi.....	108	Mastoid.....	1	Suprarenal capsules.....	2
Chest.....	103	Maxilla.....	1	Testicle.....	2
Elbow.....	2	Membranes.....	1	Thigh.....	3
Face.....	2	Meninges.....	7	Thorax.....	27
Fibroid.....	33	Mesentery.....	37	Throat.....	47
Foot.....	6	Miliary.....	107	Tissues.....	2
General.....	392	Muscles.....	2	Tongue.....	2
Glands.....	50	Neck.....	4	Uterus.....	2
Hand.....	2	Omentum.....	1	Vertebrae.....	1
Head.....	12	Ovaries.....	2	Viscera.....	1
Heart.....	15	Pelvis.....	5	Windpipe.....	6
Hip joint.....	58	Peritoneum.....	148	Womb.....	3

\* In many instances, the disease was located in more than one part of the body of the same person, therefore the number of instances included in this table will not equal the total number of cases of tuberculosis reported during the period named in the heading of the table.

## REPORTED SOURCES OF CONTAGIUM.

The difficulty experienced in tracing cases of tuberculosis to their source is nowhere better illustrated than in the very small number of reports received at this office from year to year which throw any light upon this phase of the study of tuberculosis, and it is probable that, in many instances, where a source is reported, the information is based

upon circumstantial evidence, only. From the reports of tuberculosis in 1906, it is learned that 141 cases were traced to former cases of the disease, and that, in 395 instances, the patients had tuberculous relatives or associates.

In reply to the question, "Can you trace any other case of consumption or tuberculosis to this case?" the health officers answered "Yes" in 21 instances.

#### PREDISPOSING INFLUENCES AND PREMONITORY SYMPTOMS.

For the reason that very many cases of tuberculosis are not recognized or reported until the advanced stage has been reached, the information contained in past reports relative to the predisposing influences and premonitory symptoms in tuberculosis was, necessarily, very meagre and, probably, not entirely reliable. In 1906, information along these lines was not asked for, but Table 18, which contains the information obtained during a period of ten years, is reprinted for the benefit of those who wish to make a study of the subject in connection with Table 7 in the preceding article on pneumonia. By a comparison of these tables, it may be seen that the predisposing influences are, practically, the same in tuberculosis as in pneumonia, and that both the tables emphasize the necessity for the "ounce of prevention" in the prompt and thorough treatment of a cold or cough, and in the institution of restrictive and preventive measures in cases of influenza, bronchitis, typhoid fever, measles, whooping-cough, etc.

TABLE 18.—*Predisposing influences and premonitory symptoms in SOME OF THE CASES OF tuberculosis in Michigan, in the nine years, 1897-1905.*

Disease began with or followed.	No. of instances.	Disease began with or followed.	No. of instances.	Disease began with or followed.	No. of instances.
Cough and cold.....	4,597	Fistula.....	5	Blood poisoning.....	1
Influenza.....	1,197	Heart trouble.....	5	Dropsy.....	1
Bronchitis.....	969	Scrofula.....	4	Ulceration of cornea.....	1
Pneumonia.....	634	Change of life.....	4	Aphonia.....	1
Hemorrhage.....	622	Hay fever.....	4	Insomnia.....	1
General debility.....	305	Typhoid pneumonia.....	4	Womb trouble.....	1
Pleurisy.....	87	Headache.....	4	Overexertion.....	1
Typhoid fever.....	67	Profuse expectoration.....	4	Complication of diseases.....	1
Catarrh.....	67	Pain in abdomen.....	4	Pain in shoulder.....	1
Bowel, stomach and intestinal trouble.....	60	Dyspepsia.....	3	Pus-infected hand.....	1
Measles.....	53	Marasmus.....	3	Tape worm.....	1
Asthma.....	39	Tubercular glands.....	3	Pelvic cellulitis.....	1
Child birth.....	38	Swelling in neck.....	3	Hardening of lungs.....	1
Fever.....	35	Swelling of limbs.....	3	Softening of brain.....	1
Diarrhea.....	34	Scarlet fever.....	3	Appendicitis.....	1
Abscess.....	32	Tonsillitis.....	3	Cholera infantum.....	1
Throat trouble.....	31	Paralysis.....	3	Ulceration of rectum.....	1
Malarial fever.....	29	Night sweats.....	3	Brain fever.....	1
Whooping-cough.....	26	Gangrene of lungs.....	2	Enlargement of spleen.....	1
Rheumatism.....	22	Pharyngitis.....	2	Result of operation.....	1
Glandular affection.....	20	Lupus on face.....	2	Cancer.....	1
Kidney and bladder trouble.....	13	Extreme nervousness.....	2	Pain in breast.....	1
Pain in side.....	12	Lumbago.....	2	Diphtheria.....	1
Laryngitis.....	9	Curvature of spine.....	2	Sore mouth.....	1
After miscarriage.....	8	Tumor.....	2	Result of vaccination.....	1
Suppression of menses.....	8	Diabetes.....	2	Peritonitis.....	1
Injury.....	8	Inhalation of dust.....	2	Pain in recutm.....	1
Anemia.....	7	Pott's disease.....	2	Coughed up a pin which had been swallowed in childhood.....	1
Liver trouble.....	6	Empyema.....	2	Choking and filling up.....	1
		Cigarette smoking.....	2		

## INFLUENCE OF AGE AND SEX IN TUBERCULOSIS.

Table 19 indicates that the greater number of those of both sexes who died or recovered from tuberculosis were between the ages of 20 and 30 years. From infancy up to the age of 20 years there was a gradual increase, and from 30 to 80 a gradual decrease in the numbers of those who died or recovered. Of those who died between the ages of 1 and 40 years, the greatest number were females, and of those who recovered between the ages of 10 and 40 years, the greatest number were also females. Of those who died between the ages of 40 and 80 years, the greatest number were males, which was also true of those who re-

covered between the ages of 40 and 70 years. At all ages, the females constituted about 55 per cent of those who died.

The average age of fatal cases in the thirteen years, 1894-1906, was for males 36.6 years, and for females 32.7 years.

The average age of non-fatal cases in the thirteen years, 1894-1906, was for males 32.4 years, and for females 29.7 years.

TABLE 19.—*The influence of age and sex in tuberculosis, as indicated by the numbers of those of KNOWN AGES, who died or recovered from this disease, in Michigan, in the thirteen years, 1894-1906. Arranged by sex, in age periods of ten years each.*

Age periods.	Died.						Recovered.		
	Numbers.			Per cent.			Numbers.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 10 years.....	377	427	804	1.65	1.87	3.52	3	2	5
10 to 20 years.....	898	1,853	2,751	3.93	8.12	12.05	9	13	22
20 to 30 years.....	2,965	4,149	7,114	12.99	18.18	31.17	15	21	36
30 to 40 years.....	2,146	2,633	4,779	9.40	11.54	20.94	12	22	34
40 to 50 years.....	1,595	1,421	3,016	6.99	6.23	13.22	9	6	15
50 to 60 years.....	1,142	872	2,014	5.00	3.82	8.82	6	2	8
60 to 70 years.....	793	692	1,485	3.48	3.03	6.51	3	1	4
70 to 80 years.....	414	332	746	1.81	1.46	3.27	.....	2	2
80 years and over.....	53	61	114	.23	.27	.50	.....	.....	.....
All ages.....	10,383	12,440	22,823	45.48	54.52	100.00	57	69	126

#### INFLUENCE OF COLOR IN TUBERCULOSIS.

Table 20 indicates that, according to the proportion of white and colored persons in the population, tuberculosis was most prevalent among the colored population.

Of the colored population, the disease was most prevalent among the Indians.

TABLE 20.—*The color of SOME OF THE tuberculous persons, in Michigan, reported during the twelve years, 1895-1906.*

Color.	Number of instances in which the color was stated.	Per cent.	Approximate proportion of the total population of the State.— Expressed in per cents.
White.....	21,737	96.66	99.08
Black (Negro).....	439	1.95	.64
Red (Indian).....	310	1.38	.26
Yellow (Japanese).....	1	.01	.....

## CIVIL CONDITION OF TUBERCULOUS PERSONS.

During the years 1895-1906, the reports of cases in which the civil condition of the patients was stated, showed that 59 per cent of the patients were or had been married, and that 41 per cent were single.

## INFLUENCE OF OCCUPATION IN TUBERCULOSIS.

What has been said in the preceding article, relative to the influence of occupation in pneumonia, will apply equally to tuberculosis, as a comparison of Tables 10 and 21 will show.

During the twelve years in which the occupations of tuberculous persons have been studied, very many cases were reported as having no occupation, as infants, inmates of charitable, penal and reformatory institutions, etc.

TABLE 21.—Occupations of CERTAIN OF THE tuberculous persons reported in the twelve years, 1895-1906.

Occupations.	Number of instances.	Occupations.	Number of instances.	Occupations.	Number of instances.
Housework.....	6,506	Shoemaker.....	38	Veterinary surgeon.....	3
Farmer.....	2,233	Physician or surgeon.....	37	Buttermaker.....	3
Laborer.....	1,862	Musician.....	34	Athlete.....	3
Student.....	868	Nurse.....	32	Ragpicker and sorter.....	3
Clerk (office or store).....	675	Moulder.....	32	Undertaker.....	3
Merchant.....	409	Laundry work.....	32	Woodworker.....	3
Mechanic.....	377	Waiter.....	26	Motorman.....	3
Dressmaker or milliner.....	210	Minister.....	24	Stereotypier.....	2
Teacher.....	192	Soldier.....	23	Tanner.....	2
Machinist.....	167	Fisherman.....	19	Diver.....	2
Miner.....	140	Photographer.....	19	Chiropodist.....	2
Teamster.....	123	Lawyer.....	18	Bootblack.....	2
Factory employe.....	121	Fireman.....	15	Scientist.....	2
Painter or paperhanger.....	120	Stone or marble cutter.....	14	Watchman.....	2
Salesman or agent.....	119	Miller.....	12	Contractor and builder.....	2
Saloonman.....	115	Mail carrier.....	10	Porter.....	2
Railroad employe.....	95	Janitor.....	10	Stockbuyer.....	2
Barber.....	83	Electrician.....	10	Glassworker.....	2
Printer.....	75	Theatrical person.....	9	Broommaker.....	2
Cigarmaker.....	71	Dentist.....	8	Balloonist.....	1
Engineer.....	64	Metal polisher.....	7	Attendant in asylum.....	1
Woodsmen.....	54	Boomman.....	5	Dancing master.....	1
Cook.....	54	Lumberman.....	4	Prostitute.....	1
Artist.....	53	Plumber.....	4	Feather renovator.....	1
Sailor.....	50	Hairdresser.....	4	Chimney sweep.....	1
Tailor.....	43	Hunter.....	4	Candymaker.....	1
Gardener or florist.....	41	Civil engineer or surveyor.....	4	Harnessmaker.....	1
Baker.....	38	Patrolman.....	4	Weaver.....	1
				Papermaker.....	1

## DURATION OF SICKNESS IN TUBERCULOSIS.

In studying Table 22, it should be borne in mind that, in a large number of instances, the beginning of the disease was not definitely known. The duration periods given usually representing the time which elapsed between the recognition of the disease in an advanced stage and the death or recovery of the patient. This may be seen by the large numbers of cases of those who died or recovered at some time within one year of the reported time of commencement of the sickness.

TABLE 22.—*The duration of sickness in fatal and non-fatal cases of tuberculosis, OF KNOWN DURATION, in Michigan, during the thirteen years, 1894-1906.*

Duration periods.	Fatal cases.						Non-fatal cases.		
	Numbers.			Per cent.			Numbers.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 month.....	515	426	941	3.42	2.83	6.25	5	4	9
2 months.....	336	420	756	2.23	2.79	5.02	9	5	14
3 months.....	388	515	903	2.58	3.42	6.00	5	10	15
4 months.....	357	464	821	2.37	3.08	5.45	7	2	9
5 months.....	294	404	698	1.95	2.68	4.63	5	4	9
6 months.....	538	593	1,131	3.57	3.94	7.51	4	3	7
7 months.....	238	375	613	1.58	2.49	4.07	3	4	7
8 months.....	270	365	635	1.79	2.43	4.22	4	5	9
9 months.....	202	343	550	1.34	2.31	3.65	1	4	5
10 months.....	171	223	399	1.14	1.51	2.65	1	1	2
11 months.....	138	221	359	.92	1.47	2.39	3	1	4
Under 1 year.....	3,447	4,359	7,806	22.90	28.97	51.87	47	43	90
1 to 2 years.....	1,514	1,963	3,477	10.06	13.04	23.10	11	16	27
2 to 3 years.....	823	971	1,794	5.47	6.45	11.92	3	5	8
3 to 4 years.....	371	419	790	2.47	2.78	5.25	2	3	5
4 to 5 years.....	165	177	342	1.10	1.17	2.27	2	2	4
5 years and over.....	398	442	840	2.64	2.94	5.58	.....	4	4
Totals.....	6,718	8,331	15,049	44.64	55.36	100.00	65	73	138

## RESTRICTIVE AND PREVENTIVE MEASURES.

That the education of the people in matters pertaining to the restriction of tuberculosis has not produced the results which, considering the wide publicity given the subject, might have been anticipated, is indicated by Table 23. The destruction of the sputa—upon which

the restriction of tuberculosis principally depends—was properly carried out in but forty-two per cent of all the cases which occurred in the years 1904-1906. It is not easy to place the blame for this condition, because it is believed that the members of the medical profession and the laity are both alive to the great importance of such restrictive measures, and well informed as to the simple methods of accomplishing the destruction of the infective material. In many cases the disease is not recognized, or the services of a physician called and restrictive measures begun until the patient is in the advanced stages of the disease.

In the pamphlet of instructions for the restriction and prevention of tuberculosis, issued by this Department, it is recommended that "All dejecta of a tuberculous person should be destroyed or disinfected; because it has been shown that the bacilli are to be found in the urine of persons having tubercular disease of the urinary organs, and in the feces of those having tubercular disease of the bowels, and they may be in the feces of those who swallow sputa containing the bacilli, that is, possibly, of any tuberculous person." And yet, in the years 1904-1906, in but 29 per cent of all cases reported in those years, in which the disease was located in the bowels, or bladder, were the discharges from the bowels and bladder disinfected.

The disinfection of the rooms which the patient has occupied is of great importance, and is usually carried out in as many instances as other restrictive measures, but the disinfection is too often limited to the bedroom of the patient. Where a tuberculous person has had the run of the entire house,—as they usually do prior to the last stages of the sickness—the disinfection of the entire house would be a wise precaution. It is quite probable that, in nearly every case, the disinfection of the sitting room is quite as essential as the disinfection of the bedroom of the patient. The necessity for the disinfection of all the rooms occupied or frequented by tuberculous persons is emphasized by the fact that very many of the cases of tuberculosis reported to this Department are stated to be "Coughing Consumptives," many of whom do not take precautions, during a fit of coughing, to prevent droplets of sputa from being projected on to the walls and articles of furniture.

For the better restriction of tuberculosis, three lines of work, of paramount importance, and previously outlined in many publications of this Board, are here reiterated:

1. A careful study of the early symptoms of the disease, so that incipient cases may be more easily and more frequently recognized than at the present time.
2. Careful tuition of the patient in the best measures for preventing the spread of the disease to others, and for securing himself or herself against reinfection.
3. Painstaking and conscientious effort on the part of the patient to prevent himself or herself from becoming a center of infection.

The burden of this work must, of necessity, devolve upon the medical practitioners, and it is to them we must look mainly for any material reduction in the sickness and deaths from this disease.

To the patients, the duty of taking care of and destroying the sputa, the turning away of the face and covering the mouth and nostrils during a fit of coughing when in close proximity to others, the disinfection



of the dejecta, and the thorough disinfection of all drinking vessels and other articles which may come in contact with the mouth, and which may be used by others as well as themselves, may seem irksome, and to some unnecessary and unimportant. Nevertheless, until this daily and hourly task shall become an integral part of every patient's daily life, we cannot hope for a successful termination of the warfare now being waged against this disease.

A person who, while suffering from tuberculosis, carelessly or willfully expectorates promiscuously and refuses to take precautionary measures, should be placed in detention until willing to comply with the simple and reasonable requirements laid down for his or her guidance.

TABLE 23.—*Restrictive and preventive measures in tuberculosis, in Michigan, in the three years, 1904-1906.*

Restrictive and preventive measures.	Number of cases.	Per cent.
<b>DISINFECTION OF SPUTA:</b>		
Enforced.....	3,368	* 42
Neglected.....	447	* 6
Not stated, or statements doubtful.....	4,143	* 52
<b>DISINFECTION OF SOILED BEDDING, CLOTHING, ETC.:</b>		
Enforced.....	4,110	50
Neglected.....	446	6
Not stated, or statements doubtful.....	3,615	44
<b>DISINFECTION OF DISCHARGES FROM BOWELS AND BLADDER:</b>		
Enforced.....	77	† 29
Neglected.....	171	† 64
Not stated, or statements doubtful.....	20	† 7
<b>DISINFECTION OF ROOMS OCCUPIED BY PATIENTS:</b>		
Enforced.....	3,414	42
Neglected.....	1,195	15
Not stated, or statements doubtful.....	3,562	43

\* Disinfection of the sputa was not considered necessary in 213 instances, in which there was said to be no sputa, or in which the disease was said to be located only in the bowels, stomach, liver, etc., therefore this number has been deducted from the 8,171 cases, reported during the three years, before making the per cent.

† Disinfection of the bowel discharges was considered necessary in but 268 instances, i. e., where the disease was located solely, or in combination with some other organ, in the bowels, or in some other part of the body from which infection might leave the body by way of the bowels or bladder.

## BACTERIOLOGICAL DIAGNOSIS IN TUBERCULOSIS.

During the twelve years, 1895-1906, reports relative to the bacteriological examination of 2,366 samples of sputa of suspected cases of tuberculosis indicate that 95 per cent gave positive and 5 per cent negative results.

A more general examination of the sputa of persons who exhibit any of the premonitory symptoms of tuberculosis would, it is believed, be of great service in the early diagnosis of the disease, and thus enable the patients to begin treatment at a time when remedial measures would be of great value in arresting the further progress of the disease. The early recognition of the disease followed by the prompt institution of restrictive and preventive measures are the foundation principles of all efforts which have for their object the saving of the lives of the patients themselves and the prevention of the spread of the disease to others.

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 MENINGITIS IN MICHIGAN IN 1906 AND PRECEDING YEARS.

## GENERAL PREVALENCE.

During the year 1906, meningitis was reported to the Secretary of the State Board of Health from 274 localities, in which there were reported to have occurred 650 cases, including 627 deaths from this disease.

Of the 650 cases which began in 1906, 611 died and 15 recovered in the same year; 18 died and 1 recovered in the following year, and five cases were not reported as having died or recovered.

Of the 627 deaths which occurred in 1906, 16 were taken sick in 1905, and these were not taken into consideration as *cases* in 1906, they having been included in the total number of cases in the article upon this subject in the preceding annual report.

From the numbers of cases and deaths shown in Table 24, it will be seen that, as a rule, only the fatal cases were reported.

Prior to 1904, the disease was considered under the various names reported, viz.: Cerebro-spinal meningitis, cerebral meningitis, meningitis, spinal meningitis, tubercular meningitis and traumatic meningitis. In the articles subsequent to 1903, all the various forms of the disease have been considered under the general title of meningitis.

For the purpose of learning what relation the numbers of cases and deaths from tubercular and traumatic meningitis bear to the total meningitis, these two forms of the disease have been considered separately in Table 26.

In the tables, wherever possible, totals, averages and per cents for a series of years, rather than for the single year 1906, have been shown.

By Table 24, it will be seen that, in 1899, when the statistical study of meningitis was first commenced by this Department, the disease was unusually prevalent, therefore the average of series of years beginning with 1899 is higher than it would be for similar periods under normal conditions.

Table 24 shows a much greater average death rate from meningitis

in the years in which efforts have been made for its restriction and prevention than the average death rate for a long series of years prior to that time, shown in Table 25. This is probably due to the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported, and to the fact that the rates in Table 25 do not include tubercular meningitis, which, in recent years, has caused about 16 per cent of all the deaths from meningitis.

TABLE 24.—*The prevalence of meningitis, in Michigan, in each of the eight years, 1899–1906.*

Years.	Population.*	Number of cases.†	Number of deaths.	Deaths per 100,000 population.
1899.....	2,426,331	1,306	1,079	44.5
1900.....	2,420,962	747	688	28.4
1901.....	2,448,241	614	594	24.3
1902.....	2,475,499	632	598	24.2
1903.....	2,502,758	645	630	25.2
1904.....	2,530,016	598	586	23.2
1905.....	2,557,275	675	646	25.3
1906.....	2,584,533	650	627	24.3
Annual averages.....	2,493,204	733	681	27.3

\* Estimated for intercensal years.

† From many localities, only the fatal cases were reported, so that the figures in this column do not accurately represent the numbers of cases which occurred.

TABLE 25.—*The number of reported deaths from meningitis,\* in Michigan, per 100,000 persons living, in each of the thirty years, 1869–1898. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths.....	1.2	.9	2.0	28.6	62.6	13.9	12.0	8.6	9.3	7.2	6.6	9.7
Years.....	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.
Deaths.....	19.6	13.0	12.7	12.8	9.2	9.4	9.3	9.6	8.0	8.6	9.6	6.8
Years.....	1893.	1894.	1895.	1896.	1897.	1898.†	Average, 1869–1898.					
Deaths.....	7.8	8.1	7.8	8.3	9.7	28.4	12.0					

\* Does not include tubercular meningitis.

† Not all the deaths were reported under the old law, therefore a comparison of death rates for any year subsequent to 1897 with the death rates for any period prior to 1898 would not be reliable. The rates for the twenty-nine years, ending with 1897, probably quite accurately represent the annual fluctuations of the disease.

TABLE 26.—*The reported numbers of cases and deaths from tubercular and traumatic meningitis, in Michigan, in the eight years, 1899-1906.*

Years.	Tubercular.				Traumatic.			
	Number of cases.	Number of deaths.	Per cent of all forms of meningitis.		Number of cases.	Number of deaths.	Per cent of all forms of meningitis.	
			Cases.	Deaths.			Cases.	Deaths.
1899.....	42	41	3	4	22	22	2	2
1900.....	93	83	12	12	17	17	2	2
1901.....	86	86	14	14	22	22	4	4
1902.....	96	94	15	16	8	8	1	1
1903.....	106	106	16	17	14	14	2	2
1904.....	126	133	21	23	24	24	4	4
1905.....	95	107	14	16	3	4	4	.6
1906.....	108	106	17	17	9	8	1	1

## GEOGRAPHICAL DISTRIBUTION OF MENINGITIS.

Table 27 indicates that during the eight years, ending with 1906, meningitis was more prevalent than the average for the State as a whole (shown in Table 24) in the Upper Peninsula, Southeastern, North-western, Northern, Western and Northern Central Divisions. By the same standard, the disease was much more prevalent than the average in the counties of Houghton, Antrim, Keweenaw, Wexford, Baraga, Marquette, Wayne, Menominee, Benzie, Cheboygan, Emmet, Schoolcraft, Kent and Mecosta.

TABLE 27.—The geographical distribution of meningitis, in Michigan, in the eight years, 1899-1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.

Geographical divisions.	Average.			
	Population.*	Cases.†	Deaths.	Death rates.
<b>UPPER PENINSULAR DIVISION.</b>	268,197	121.9	110.9	41.4
Alger county.....	6,246	2	2	32.0
Baraga county.....	5,010	2	2	39.9
Chippewa county.....	21,619	5	5	23.1
Delta county.....	25,987	7	7	26.9
Dickinson county.....	18,295	6	5	27.3
Gogebic county.....	16,916	5	5	29.6
Houghton county.....	67,694	55	49	72.4
Iron county.....	† 8,941	1	1	11.2
Keweenaw county.....	4,003	2	2	50.0
Luce county.....	3,477	.9	.9	25.9
Mackinac county.....	7,909	2	2	25.3
Marquette county.....	40,330	18	16	39.7
Menominee county.....	26,440	10	10	37.8
Ontonagon county.....	6,847	3	1	14.6
Schoolcraft county.....	8,483	3	3	35.4
<b>NORTHWESTERN DIVISION.</b>	89,996	37	29	32.2
Benzie county.....	10,649	5	4	37.6
Grand Traverse county.....	22,546	6	5	22.2
Leelanau county.....	10,832	3	3	27.7
Manistee county.....	27,484	12	8	29.1
Wexford county.....	18,485	11	9	48.7
<b>NORTHERN DIVISION.</b>	82,281	29.4	26.3	32.0
Antrim county.....	15,766	9	8	50.7
Charlevoix county.....	15,327	3	3	19.6
Cheboygan county.....	16,755	7	6	35.8
Crawford county.....	3,465	.4	.3	8.7
Emmet county.....	16,853	6	6	35.6
Kalkaska county.....	7,333	2	2	27.3
Otsego county.....	6,782	2	1	14.7
<b>NORTHEASTERN DIVISION.</b>	59,037	10.2	9.1	15.4
Alcona county.....	5,654	.6	.6	10.6
Alpena county.....	19,501	3	3	15.4
Iosco county.....	10,250	3	2	19.5
Montmorency county.....	3,468	.8	.8	23.1
Ogemaw county.....	8,398	.8	.6	7.1
Oscoda county.....	1,771	.1	.1	5.6
Presque Isle county.....	9,995	2	2	20.0
<b>WESTERN DIVISION.</b>	275,333	84	76	27.6
Kent county.....	136,378	54	47	34.5
Lake county.....	5,007	1	1	20.0
Mason county.....	19,620	3	3	15.3
Muskegon county.....	36,873	8	8	21.7
Newaygo county.....	18,134	4	4	22.1
Oceana county.....	17,483	3	3	17.2
Ottawa county.....	41,838	11	10	23.9
<b>NORTHERN CENTRAL DIVISION.</b>	106,082	31.5	28.3	26.7
Clare county.....	8,922	3	2	22.4
Gladwin county.....	7,801	1	1	12.8
Isabella county.....	23,899	8	7	29.3
Mecosta county.....	20,546	8	7	34.1
Midland county.....	14,816	4	4	27.0
Missaukee county.....	9,941	2	2	20.1
Oseola county.....	18,482	5	5	27.1
Roscommon county.....	1,675	.5	.3	17.9

\*† These footnotes are below Table 24 on a preceding page.

‡ Average for seven years only.

TABLE 27.—CONCLUDED.

Geographical divisions.	Average.			
	Population.*	Cases. †	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	346,418	75.9	74.9	21.6
Arenac county.....	9,897	9	9	9.1
Bay county.....	63,711	16	16	25.1
Huron county.....	35,018	7	6	17.1
Lapeer county.....	27,356	4	4	14.6
Saginaw county.....	84,153	18	18	21.4
Sanilac county.....	35,005	7	7	20.0
St. Clair county.....	55,228	14	14	25.3
Tuscola county.....	36,050	9	9	25.0
CENTRAL DIVISION.	315,459	74	68	21.6
Barry county.....	22,328	7	6	26.9
Clinton county.....	25,285	6	5	19.8
Eaton county.....	31,238	7	7	22.4
Genesee county.....	42,446	9	9	21.2
Gratiot county.....	30,192	9	8	26.5
Ingham county.....	42,605	9	9	21.1
Ionia county.....	34,902	9	7	20.1
Livingston county.....	19,029	3	3	15.8
Montcalm county.....	33,499	9	8	23.9
Shiawassee county.....	33,935	6	6	17.7
SOUTHWESTERN DIVISION.	143,116	30	27	18.9
Allegan county.....	38,984	10	9	23.1
Berrien county.....	49,551	9	8	16.1
Cass county.....	20,393	4	4	19.6
Van Buren county.....	34,188	7	6	17.6
SOUTHERN CENTRAL DIVISION.	323,333	72	67	20.7
Branch county.....	26,592	6	5	18.8
Calhoun county.....	52,099	10	10	19.2
Hillsdale county.....	29,837	5	5	16.8
Jackson county.....	47,524	12	11	23.1
Kalamazoo county.....	48,041	12	11	22.9
Lenawee county.....	48,891	9	9	18.4
St. Joseph county.....	23,563	7	6	25.5
Washtenaw county.....	46,786	11	10	21.4
SOUTHEASTERN DIVISION.	483,790	169	168	34.7
Macomb county.....	33,129	8	8	24.1
Monroe county.....	33,049	9	9	27.2
Oakland county.....	45,377	7	6	13.2
Wayne county.....	372,235	145	145	39.0

\*† These footnotes are below Table 24, on a preceding page.

#### THE PREVALENCE OF MENINGITIS IN URBAN AND RURAL LOCALITIES.

Table 28 shows meningitis to have been present, in 1906, in 26 per cent of the incorporated cities and villages, whose population could be estimated for that year. There were 32 cities and villages whose populations could not be estimated for the year 1906, therefore these localities have been included with the rural localities, shown in the last line of Table 28.

As in the case of pneumonia and tuberculosis, previously considered, as a rule, meningitis was most prevalent in the large centers of population.

As indicated by the death rates, the cities and villages in which

meningitis was much more prevalent than the average for the State in 1906 (24.3 deaths per 100,000 of the population) were: Calumet Township (89.5), Ishpeming (74.0), Cheboygan (58.4), Detroit (56.0), Wyandotte (54.1), Menominee (48.9), Alpena (47.2), Adrian (44.7), Negaunee (44.6), Hancock (42.7), Owosso (42.7), Holland (41.9), Ann Arbor (41.0), Albion (38.8), Laurium (34.7), Traverse City (32.9), Coldwater (32.1) and Flint (31.7).

TABLE 28.—*The prevalence of meningitis in urban and rural localities in Michigan, in 1906.*

Localities—grouped according to density of population.	Population.*	Health jurisdictions.			Cases.†	Deaths.	Death rates per 100,000 of the population.
		Infected.					
		Total.	Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	440,984	2	2	100	211	217	49.2
Cities from 25,000 to 50,000.....	147,162	4	4	100	25	24	16.3
Cities from 10,000 to 25,000, and Calumet township (17,885).....	261,286	18	18	100	90	84	32.1
Cities and villages from 5,000 to 10,000‡.....	153,187	24	21	88	45	39	25.5
Cities and villages under 5,000‡.....	369,743	337	55	16	78	74	20.0
Total urban.....	1,372,362	385	100	26	449	438	31.9
Balance of localities—principally townships§.....	1,212,171	1,254	174	14	201	189	15.6

\*, †. These footnotes are below Table 24, on a preceding page.

‡Exclusive of thirty-two villages in the two groups, for which the population in 1906 cannot be correctly estimated.

§Includes the thirty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of Urban localities, which have corresponding populations.

#### THE SEASONAL PREVALENCE OF MENINGITIS.

Table 29 is compiled from two different sources, and shows that meningitis is most prevalent in the months of March, April and May, and least prevalent in the months of October, November and December. This coincides with the results of observations made in epidemics of meningitis in this and other countries, notably, the outbreak in New York in 1892 and 1893, which was most violent in May; the epidemic in Cologne in 1895, which reached its maximum in April; and the epidemic in Strasburg in 1841, in which the greatest numbers of cases occurred in March.

TABLE 29.—*The seasonal prevalence of meningitis, in Michigan, in so far as indicated by the average numbers of persons taken sick and who died from this disease in each month, in the eight years, 1899–1906.*

Months.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average numbers of those taken sick	39	43	69	65	55	37	40	39	40	34	28	31
Average numbers of deaths.....	43	49	64	68	62	44	45	43	41	37	30	34

TABLE 30.—*The reported sources of contagium and predisposing influences in meningitis, in Michigan, in the eight years, 1899–1906.*

Source, and predisposing influence.	Number of instances.
Traced to a former case of meningitis in another person.....	80
Following an attack, in the same person, of:	
Influenza.....	91
Pneumonia.....	72
Tuberculosis.....	44
Bronchitis.....	20

TABLE 31.—*Meningitis, in Michigan, in the three years, 1904–1906, and previous and contemporaneous cases of meningitis, tuberculosis, influenza and pneumonia, which occurred in the same families in which the meningitis patients resided.*

Diseases.	The time which elapsed between cases of meningitis in 1904–1906 and previous and contemporaneous cases of the diseases named below, with the number of instances in each period of time.												
	On or about the same time.	1 day.	3 days.	4 days.	14 days.	1 month.	2 months.	3 months.	4 months.	5 months.	6 months.	1 year and over.	No time stated.
Meningitis.....	14	2			2		1		1		1	1	6
Tuberculosis.....	15			1			2	3	1		2	4	19
Influenza.....	3		1	1		1							5
Pneumonia.....	2						1			1	1		4



REPORTED SOURCES OF CONTAGIUM AND PREDISPOSING INFLUENCES IN MENINGITIS.

By reference to Table 30 in the annual report of this Department, for 1905, and to corresponding tables in preceding reports, it may be seen that, as compared with the total numbers of cases of meningitis reported to this Department, the numbers of instances in which the sources of contagium and the predisposing influences in meningitis were reported were very small. For this reason, in 1906, health officers were only requested to supply information relative to those cases which were traced to former cases of the disease, or which followed the four diseases, shown in Table 30 in this article, which are intimately associated with meningitis.

Table 30 may well be studied in connection with Table 31, and when continued for a number of years, Table 31 will probably be of much value in determining the connection between outbreaks of meningitis and the other diseases named in the table.

THE INFLUENCE OF AGE AND SEX IN MENINGITIS.

Table 32 confirms what has been stated in preceding reports relative to meningitis, that it is essentially a disease of childhood, nearly 57 per cent of all the fatal cases, in which the age was stated, during the eight years ending in 1906, having occurred in children under five years of age. There was a gradual decrease in the number of deaths corresponding with each increase in the ages.

With but one exception (ages 10 to 14 years), meningitis was most fatal amongst the male population at all ages shown in the table.

TABLE 32.—*The influence of age and sex in meningitis, in Michigan, as indicated by the numbers of those, OF KNOWN AGES, who died from this disease in the eight years, 1899-1906. Arranged, by sex, in age periods of five years each.*

Age periods.	Numbers of deaths.			Per cent.			Average deaths per year.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
Under 5 years.....	1,731	1,319	3,050	32.06	24.43	56.49	216	165	381
5 to 9 years.....	307	293	600	5.68	5.43	11.11	38	37	75
10 to 14 years.....	166	182	348	3.07	3.37	6.44	21	23	44
15 to 19 years.....	179	153	332	3.32	2.83	6.15	22	19	41
20 to 24 years.....	113	97	210	2.09	1.80	3.89	14	12	26
25 to 29 years.....	84	75	159	1.55	1.39	2.94	11	9	20
30 to 34 years.....	66	54	120	1.22	1.00	2.22	8	7	15
35 to 39 years.....	67	48	115	1.24	.89	2.13	8	6	14
40 to 44 years.....	58	48	106	1.07	.99	1.96	7	6	13
45 to 49 years.....	43	37	80	.80	.68	1.48	5	5	10
50 years and over.....	172	108	280	3.19	2.00	5.19	21	14	36
All ages.....	2,986	2,414	5,400	55.29	44.71	100.00	373	302	675

## THE DURATION OF SICKNESS IN MENINGITIS.

Table 33 shows that of 2,712 fatal cases of meningitis in the six years, 1901-1906, 37 per cent of the deaths occurred between the first and fifth days; about 62 per cent between the first and tenth days, and 77 per cent between the first and fifteenth days.

TABLE 33.—*The duration of sickness in fatal cases of meningitis, OF KNOWN DURATION, in Michigan, in the six years, 1901-1906. Arranged by sex, in five day periods.*

Duration periods.	Numbers of deaths.			Averages per year.			Per cent.		
	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.	Males.	Females.	Both sexes.
1 to 5 days.....	581	414	995	97	69	166	21.42	15.27	36.69
6 to 10 days.....	344	340	684	57	57	114	12.68	12.54	25.22
11 to 15 days.....	215	197	412	36	33	69	7.93	7.26	15.19
16 to 20 days.....	98	100	198	16	17	33	3.61	3.69	7.30
21 to 25 days.....	75	67	142	13	11	24	2.77	2.47	5.24
26 to 30 days.....	36	33	69	6	6	12	1.33	1.21	2.54
31 to 35 days.....	15	18	33	3	3	6	.55	.66	1.21
36 to 40 days.....	11	13	24	2	2	4	.41	.48	.89
41 to 45 days.....	14	9	23	2	2	4	.52	.33	.85
46 to 50 days.....	4	10	14	.7	2	2.7	.15	.37	.52
51 days and over.....	65	53	118	11	9	20	2.40	1.95	4.35
Totals and averages.....	1,458	1,254	2,712	243	209	452	53.77	46.23	100.00

## RESTRICTIVE AND PREVENTIVE MEASURES IN MENINGITIS.

As may be seen by reference to Table 34, information relative to the restrictive and preventive measures in meningitis has been very meagre.

As indicated by those reports in which a *definite* statement was made relative to the restrictive and preventive measures in meningitis in the three years, 1904-6, but a small proportion of the patients were isolated from all persons, excepting the nurses and attending physicians. A somewhat better showing is made in regard to the disinfection of sputa, articles liable to be soiled by sputa and the rooms occupied by the sick persons.

TABLE 34.—*Restrictive and preventive measures in meningitis, in Michigan, in the three years, 1904-1906.*

Restrictive and preventive measures.	Number of cases.	Per cent.
<b>ISOLATION:</b>		
Enforced.....	347	18
Neglected.....	564	29
Not stated, or statements doubtful.....	1,012	53
<b>DISINFECTION OF SPUTA:</b>		
Enforced.....	421	* 20
Neglected.....	313	* 13
Not stated, or statements doubtful.....	1,189	* 67
<b>DISINFECTION OF BEDDING, CLOTHING, ETC., SOILED BY SPUTA:</b>		
Enforced.....	522	* 26
Neglected.....	289	* 12
Not stated, or statements doubtful.....	1,112	* 62
<b>DISINFECTION OF ROOM OCCUPIED BY PATIENT:</b>		
Enforced.....	844	44
Neglected.....	389	20
Not stated, or statements doubtful.....	690	36

\*Ninety-five cases, in which there was said to be no sputa, excluded in making this per cent.

## TYPHOID FEVER IN MICHIGAN IN 1906 AND PRECEDING YEARS.

### GENERAL PREVALENCE.

By Table 35, it may be seen, that, in 1906, typhoid fever was more prevalent than in 1905 and also more prevalent than in the average year.

A comparison of Table 35 with Table 36 will show that the average death rate from typhoid fever in the years since 1884—when active measures for its restriction were instituted by this Department—is considerably lower than in the fifteen years preceding 1884. It will also be seen that, in the years 1884-1897, inclusive, as a rule, the annual death rates were much lower than the rates in subsequent years. The higher death rates in the years 1898-1906 may be accounted for partly by the fact that, prior to 1898, under the old law for the registration of deaths, not all deaths were reported. It will be seen, however, that, in the nine years ending with 1906, the death rates from typhoid fever have not decreased, as would be expected from the efforts put forth by this Department for the restriction of the disease. This is believed to be due to the fact that, in many localities which have public water

supplies, there has been little, if any, provision made for the removal of sewage, necessitating a gradually increasing number of cesspools and resulting in a gradually increasing contamination of the underground bodies of water from which many persons in those localities derive their water supplies.

It is safe to say that no substantial decrease in the sickness and mortality from typhoid fever may be expected until every cesspool and shallow well shall have been abolished, and every public water supply permanently protected against contamination.

TABLE 35.—*The prevalence of typhoid fever, in Michigan, in each of the twenty-three years, 1884–1906. Compiled from reports to the State Department of Health.\**

Years.	Population.*	Reported cases.†	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884.....	1,853,658	969	290	27	15.6
1885.....	1,893,697	715	194	23	10.2
1886.....	1,933,735	1,194	282	18	14.6
1887.....	1,973,774	3,424	411	17	20.8
1888.....	2,013,812	1,511	310	21	15.4
1889.....	2,053,851	2,530	‡ 681	27	33.2
1890.....	2,093,889	1,924	304	16	14.5
1891.....	2,130,827	4,670	697	15	32.7
1892.....	2,167,765	2,591	538	21	24.8
1893.....	2,204,703	3,512	594	17	26.9
1894.....	2,241,641	2,805	506	18	22.6
1895.....	2,271,531	3,751	621	17	27.3
1896.....	2,301,421	2,506	409	16	17.8
1897.....	2,331,311	1,900	352	19	15.1
1898.....	2,361,201	2,874	634	24	26.9
1899.....	2,391,091	3,194	638	20	26.7
1900.....	2,420,982	5,122	920	18	38.0
1901.....	2,450,872	3,002	665	22	27.1
1902.....	2,475,499	2,456	596	24	24.1
1903.....	2,502,758	2,840	640	23	28.9
1904.....	2,530,016	3,028	731	24	29.7
1905.....	2,557,275	2,774	661	24	25.8
1906.....	2,584,533	3,163	785	25	30.4
Averages per year.....	2,249,558	2,715	542	20	24.1

\* Estimated for intercensal years.

† Many health officers reported only the fatal cases, so that the total number of cases for each year was much in excess of those given in this column.

‡ In an outbreak of typhoid fever at Negaunce, in 1889, 300 cases *but no deaths* were reported, therefore the deaths from typhoid fever for that year reported to the Secretary of State have been used in place of those reported to the State Department of Health.

TABLE 36.—*The number of deaths from typhoid fever,\* in Michigan, per 100,000 persons living, in each of the fifteen years, 1869-1883. Compiled from reports to the Secretary of State.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	39.0	48.5	29.2	49.4	52.8	45.8	31.3	30.1	30.3	22.6	25.5
Years.....	1880.	1881.	1882.	1883.	Average. 1869-1883.						
Deaths.....	31.9	55.2	28.4	25.0	36.3						

\*Includes typho-malarial fever but not typhoid pneumonia.

#### GEOGRAPHICAL DISTRIBUTION.

Table 37 indicates that, in the sixteen years, 1891-1906, the death rate from typhoid fever in the Upper Peninsula Division was considerably higher than the average for the entire State for the same period (26.3 deaths per 100,000 inhabitants) and that this high death rate was due to unusual death rates in the counties of Baraga, Chippewa, Delta, Gogebic, Iron, Luce, Marquette and Menominee. The unusual death rates in each of these counties were due to high death rates, in certain years, in the following localities:

**BARAGA COUNTY**—Baraga township, 1891, 1899; Baraga village, 1891, 1899.

**CHIPPEWA COUNTY**—Superior township, 1899; Sault Ste. Marie city, 1893-4, 1900-6.

**DELTA COUNTY**—Escanaba city, 1892-3, 1897-1906; Gladstone city, 1898-9, 1901-6.

**GOGEBIC COUNTY**—Bessemer city, 1893-4, 1896, 1900-1; Ironwood city, 1891, 1893, 1900, 1904-6.

**IRON COUNTY**—Hematite township, 1892; Iron River village, 1891; Crystal Falls city, 1891-2, 1906.

**LUCE COUNTY**—Newberry village, 1900, 1903-4.

**MARQUETTE COUNTY**—Michigamme township, 1891, 1893; Republic township, 1891, 1893; Wells township, 1904; Ishpeming city, 1891-2, 1894, 1897-8, 1900, 1903; Marquette city, 1892, 1895, 1899-1900, 1902, 1904-6; Negaunee city, 1891-4, 1896, 1898, 1902, 1904-6.

**MENOMINEE COUNTY**—Spaulding township, 1891; Menominee city, 1891-6, 1899-01, 1903-6.

In addition to the foregoing, in the counties of Emmet, Kent, Midland, Missaukee, Otsego and Wexford, the death rates from typhoid fever in the sixteen years, 1891-1906, were much higher than the average for the State as a whole, but, by reason of the low death rates in other counties in the same geographical divisions, the death rates of the geographical divisions in which these counties are located do not differ greatly from the average for the entire State. The high death rates in the six counties under consideration were due to high death rates, in certain years, in the following localities:

**EMMET COUNTY**—Little Traverse township, 1891; Springvale township,

TABLE 37.—*The geographical distribution of typhoid fever, in Michigan, in the sixteen years, 1891–1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	240,163	59.0	85.7	35.7
Alger county.....	4,609	3	4	8.7
Baraga county.....	4,663	26	3	64.3
Chippewa county.....	18,649	54	8	42.9
Delta county.....	22,846	44	11	48.1
Dickinson county.....	16,832	35	4	23.8
Gogebic county.....	15,824	87	8	50.6
Houghton county.....	56,311	82	13	23.1
Iron county.....	7,363	12	3	40.7
Keveeenaw county.....	3,358	5	8	23.8
Luce county.....	2,956	6	1	33.8
Mackinac county.....	7,656	4	5	6.5
Marquette county.....	39,724	138	17	42.8
Menominee county.....	25,081	60	13	51.8
Ontonagon county.....	6,373	13	1	15.7
Schoolcraft county.....	7,918	21	2	25.3
NORTHWESTERN DIVISION.	83,270	110	24	28.8
Benzie county.....	9,434	18	3	31.8
Grand Traverse county.....	20,188	35	6	29.7
Leelanau county.....	10,207	5	2	19.6
Manistee county.....	27,048	27	7	25.9
Wexford county.....	16,393	25	6	36.6
NORTHERN DIVISION.	72,291	110	20.6	28.5
Antrim county.....	14,225	19	4	28.1
Charlevoix county.....	13,287	14	4	30.1
Cheboygan county.....	15,460	19	2	12.9
Crawford county.....	3,117	5	6	19.2
Emmet county.....	13,826	28	5	36.2
Kalkaska county.....	6,536	8	2	30.6
Otsego county.....	5,840	17	3	51.4
NORTHEASTERN DIVISION.	55,655	48	12.5	22.5
Alcona county.....	5,579	4	8	14.3
Alpena county.....	18,770	13	4	21.3
Iosco county.....	11,407	8	3	26.3
Montmorency county.....	2,996	3	6	20.0
Ogemaw county.....	7,088	8	2	28.2
Oscoda county.....	1,814	4	1	5.5
Presque Isle county.....	8,001	8	2	25.0
WESTERN DIVISION.	268,422	435	81	30.2
Kent county.....	130,032	306	48	36.9
Lake county.....	5,504	7	1	18.2
Mason county.....	19,171	13	6	31.3
Muskegon county.....	37,308	27	7	18.8
Newaygo county.....	18,717	20	6	32.1
Oceana county.....	17,130	25	4	23.4
Ottawa county.....	40,560	32	9	22.2
NORTHERN CENTRAL DIVISION.	100,458	146	27.3	27.2
Clare county.....	8,519	12	2	23.5
Gladwin county.....	6,419	10	1	15.6
Isabella county.....	22,835	34	5	21.9
Mecosta county.....	20,761	24	6	28.9
Midland county.....	14,128	26	5	35.4
Missaukee county.....	8,543	22	4	46.8
Osceola county.....	17,582	16	4	22.8
Rosecommon county.....	1,671	2	3	18.0

\* See † footnote below Table 35, on a preceding page.

TABLE 37.—CONCLUDED.

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
<b>BAY AND EASTERN DIVISION.</b>	<b>341,768</b>	<b>387</b>	<b>83.7</b>	<b>24.5</b>
Arenac county.....	8,491	6	7	8.2
Bay county.....	62,982	58	20	31.8
Huron county.....	33,853	31	6	17.7
Lapeer county.....	23,094	30	6	21.4
Saginaw county.....	83,428	67	16	19.2
Sanilac county.....	34,613	54	11	31.8
St. Clair county.....	54,920	99	16	29.1
Tuscola county.....	35,287	42	8	22.6
<b>CENTRAL DIVISION.</b>	<b>314,972</b>	<b>430</b>	<b>78</b>	<b>24.8</b>
Barry county.....	22,984	24	3	13.1
Clinton county.....	25,740	42	7	27.2
Eaton county.....	31,952	49	7	21.9
Genesee county.....	41,521	39	3	19.3
Gratiot county.....	29,611	46	9	30.4
Ingham county.....	41,253	94	16	38.8
Ionia county.....	34,872	45	10	28.7
Livingston county.....	19,700	22	3	15.2
Montcalm county.....	33,843	28	8	23.6
Shiawassee county.....	33,496	41	7	20.9
<b>SOUTHWESTERN DIVISION.</b>	<b>140,251</b>	<b>152</b>	<b>32</b>	<b>22.8</b>
Allegan county.....	39,111	30	7	17.9
Berrien county.....	47,745	50	12	25.1
Cass county.....	20,768	26	4	19.3
Van Buren county.....	32,627	46	9	27.6
<b>SOUTHERN CENTRAL DIVISION.</b>	<b>316,804</b>	<b>405</b>	<b>70</b>	<b>22.1</b>
Branch county.....	26,368	33	6	22.8
Calhoun county.....	49,942	71	13	26.0
Hillsdale county.....	30,010	23	5	16.7
Jackson county.....	47,109	81	13	27.6
Kalamazoo county.....	45,184	81	10	22.1
Lenawee county.....	48,720	63	11	22.6
St. Joseph county.....	24,297	22	5	20.6
Washtenaw county.....	45,174	31	7	15.5
<b>SOUTHEASTERN DIVISION.</b>	<b>444,519</b>	<b>302</b>	<b>112</b>	<b>25.2</b>
Macomb county.....	32,770	42	8	24.4
Monroe county.....	33,104	39	8	24.2
Oakland county.....	44,043	31	7	15.9
Wayne county.....	334,602	190	89	26.6

\* See † footnote below Table 35, on a preceding page.

1905; Harbor Springs village, 1891, 1893, 1895, 1897, 1903-6; Petoskey city, 1897-1902, 1906.

KENT COUNTY—Ada township, 1900; Byron township, 1899; Grand Rapids township, 1890, 1903; Lowell township, 1891; Paris township, 1890, 1900; Plainfield township, 1889, 1891; Sparta township, 1895, 1900; Walker township, 1894, 1899, 1903; Wyoming township, 1895, 1904-6; Lisbon village, 1900; Sparta village, 1890, 1906; Grand Rapids city, 1891-1906.

MIDLAND COUNTY—Ingersoll township, 1898; Larkin township, 1900; Warren township, 1898, 1901; Coleman village, 1894; Midland city, 1895, 1899, 1901-2, 1904.

MISSAUKEE COUNTY—Norwich township, 1899, 1900; Reeder township,

1891, 1894, 1895; Richland township, 1893, 1900; Riverside township, 1891; Lake City village, 1893; McBain village, 1894, 1898.

OTSEGO COUNTY—Corwith township, 1891, 1899; Hayes township, 1900; Gaylord village, 1891, 1898, 1900, 1902-4.

WEXFORD COUNTY—Boon township, 1890, 1892; Greenwood township, 1900, 1903; Slagle township, 1898; South Branch township, 1889, 1891; Springville township, 1894, 1898, 1900; Harrietta village, 1892; Cadillac city, 1889, 1893, 1900-01, 1903, 1905-6.

THE PREVALENCE OF TYPHOID FEVER IN URBAN AND RURAL LOCALITIES.

Table 38 indicates that, in 1906, typhoid fever was more prevalent in urban than in rural localities.

In the urban localities, typhoid fever was most prevalent in the group of localities having populations of from 10,000 to 25,000, and least prevalent in the group having populations of from 5,000 to 10,000.

By a comparison of the death rates in Table 38 with the death rate from typhoid fever, in 1906, for the State as a whole, shown in Table 35, it will be seen that the death rates for the second and third groups of localities in Table 38 are considerably higher than the rate for the entire State in that year.

The localities in each of the first four groups in Table 38, together with the reported sickness and deaths from typhoid fever in each locality, in 1906 and in the average year, are shown in Table 39.

TABLE 38.—*The prevalence of typhoid fever in urban and rural localities, in Michigan, in 1906.*

Localities—grouped according to density of population.	Estimated population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Infected.					
		Total.	Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	440,984	2	2	100	447	134	30.4
Cities from 25,000 to 50,000.....	147,162	4	4	100	254	61	41.5
Cities from 10,000 to 25,000, and Calumet township (17,885).....	261,286	18	18	100	436	125	47.8
Cities and villages from 5,000 to 10,000†.....	153,187	24	22	92	163	41	26.8
Cities and villages under 5,000‡.....	369,743	337	156	46	554	110	29.8
Total urban.....	1,372,362	385	202	52	1,854	471	34.3
Balance of localities, principally townships‡.....	1,212,171	1,254	502	40	1,309	314	25.9

\* This footnote is below Table 35, on a preceding page.

† Exclusive of thirty-two villages in the two groups, for which the populations in 1906 cannot be correctly estimated.

‡ Includes the thirty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.



TABLE 39.—The prevalence of typhoid fever, in 1906 and preceding years, in each of a number of localities, in Michigan, having populations of 5,000 and upwards.

Localities—grouped according to population.	1906.			Average, 1889-1905.				
	Population. (Estimated.)	Cases.	Deaths.	Deaths per 100,000 inhabitants.	Population.	Cases.	Deaths.	Deaths per 100,000 inhabitants.
<b>POPULATION OF 50,000 AND OVER:</b>								
Detroit.....	341,189	*	94	27.6	† 261,743	*	71	27.1
Grand Rapids.....	99,795	352	40	40.1	81,074	254	39	48.1
<b>POPULATION 25,000 TO 50,000:</b>								
Bay City.....	40,588	*	26	64.1	41,197	*	14	34.0
Jackson.....	25,360	15	6	23.7	23,523	44	8	34.0
Kalamazoo.....	32,471	73	15	46.2	23,209	59	7	30.2
Saginaw.....	48,743	40	14	28.7	44,805	34	9	20.1
<b>POPULATION 10,000 TO 25,000:</b>								
Adrian.....	11,193	*	5	44.7	9,642	*	3	31.1
Alpena.....	12,699	*	9	70.9	11,914	*	3	25.2
Ann Arbor.....	14,644	12	3	20.5	12,448	7	2	16.1
Battle Creek.....	24,038	58	11	45.8	17,335	29	6	34.6
Escanaba.....	11,873	*	11	92.7	8,888	*	7	78.8
Flint.....	15,775	*	6	38.0	12,018	13	3	25.0
Ironwood.....	10,176	*	4	39.3	9,236	*	6	65.0
Ishpeming.....	10,807	*	2	18.5	12,003	52	6	50.0
Lansing.....	22,172	79	20	90.2	16,397	42	7	42.7
Manistee.....	11,932	18	1	8.4	13,372	10	2	15.0
Marquette.....	10,969	23	5	45.6	9,886	19	3	30.3
Menominee.....	10,235	*	10	97.7	11,876	*	10	84.2
Muskegon.....	20,937	18	7	33.4	21,085	17	4	19.0
Pontiac.....	11,442	*	4	35.0	8,531	*	1	11.7
Port Huron.....	20,463	*	10	48.9	19,023	28	5	26.3
Sault Ste. Marie.....	11,894	*	5	42.0	8,763	55	6	68.5
Traverse City.....	12,152	138	11	90.5	7,656	11	2	26.1
Calumet Township.....	17,885	3	1	5.6	13,142	32	4	30.4
<b>POPULATION 5,000 TO 10,000:</b>								
Albion.....	5,155	4	0	0	4,537	6	.9	19.8
Benton Harbor.....	6,772	4	1	14.8	5,611	7	1	17.8
Cadillac.....	7,341	35	2	95.4	5,607	9	2	35.7
Charlotte.....	5,044	16	7	39.7	4,255	8	1	23.5
Cheboygan.....	6,851	7	0	0	6,617	10	1	15.1
Coldwater.....	6,230	7	1	16.1	5,744	13	2	34.8
Grand Haven.....	5,487	6	2	54.7	5,061	2	7	13.8
Hancock.....	7,031	*	3	28.4	3,319	*	1	30.1
Hillsdale.....	5,139	3	1	19.5	4,236	4	.6	14.2
Holland.....	9,554	8	1	10.5	6,787	7	2	29.5
Ionia.....	5,229	6	1	19.1	5,000	5	1	20.0
Iron Mountain.....	8,256	1	1	12.1	8,507	32	4	19.4
Laurium.....	8,658	0	0	0	4,133	6	.8	19.4
Ludington.....	7,396	4	1	13.7	7,565	6	2	26.4
Monroe.....	6,671	1	1	15.0	5,489	6	.9	16.4
Mt. Clemens.....	7,374	*	3	40.7	6,031	14	2	33.2
Negaunee.....	6,728	20	4	59.5	6,438	52	6	93.2
Norway.....	5,211	6	1	19.2	3,831	2	.6	15.7
Owosso.....	9,370	3	1	10.7	8,206	14	2	24.4
Petoskey.....	5,136	15	3	58.4	4,274	9	1	23.4
St. Joseph.....	5,406	9	2	37.0	4,701	3	.6	12.8
Wyandotte.....	5,546	*	4	72.1	4,663	*	4	85.3
Ypsilanti.....	7,692	4	1	13.0	6,799	5	.7	10.3

\*Fatal cases only reported in one or more years.

†Does not include the villages of Delray and Woodmere, which, in 1905, were separate health jurisdictions.

‡Average 1893-1905. From 1889 to 1902, inclusive, the disease was present but not reported.

#### THE REPORTED SOURCES OF CONTAGIUM IN TYPHOID FEVER.

In the sixteen years, 1891-1906, over sixty-four per cent of all the cases of typhoid fever were not traced to their source. This is to be regretted, because if in any outbreak of typhoid fever, the source of the disease is promptly located and removed, and proper measures taken

to prevent the further spread of the disease from the sick person, or persons, the disease may usually be restricted to those persons who were infected prior to the recognition of the disease at the beginning of the outbreak.

Of the cases of typhoid fever in which a source of contagium was given, as shown in Table 40, fifty-eight per cent were said to be due to water or ice. This number would be much greater if the sources of all the cases were traced. For instance, in Grand Rapids, which has a contaminated water supply, there are several hundred cases of typhoid fever in each year, most of which are undoubtedly due to the water supply, and yet a source is not usually reported. This is also true of many other localities in which the water supplies are the undoubted source of the typhoid fever, but the connection is not traced or reported to this Department.

The comparatively large number of cases in which the infection was traced to outside jurisdictions, included, principally, those cases in which the patients were taken sick in a camp, or other place, away from home, and were removed to their homes, or to a hospital, in other health jurisdictions, to be cared for. The localities from which and to which typhoid fever was spread in 1906 are shown in Table 41.

The removal, from one locality to another, of a person suffering from typhoid fever is a dangerous practice, and is unlawful unless the same is done with the consent and under the supervision of the health officials of the locality to which the patient is to be removed.

The 2,570 cases which were said to be due to coming in contact with or nursing typhoid fever patients were probably due, in the main, to the neglect of proper precautions on the part of those in attendance upon the patients. Where the utmost care and cleanliness is observed by those in charge of cases of typhoid fever, cases due to secondary infection should be of rare occurrence. It often happens, however, that the nursing is done by some member of the family, who may also handle food, or assist in the preparation of meals, to be eaten by herself and other members of the family; and the hands may not always be disinfected and cleansed between the act of caring for the patient and the handling of the food.

It is probable that many of the cases of typhoid fever which occurred in the same household, camp, etc., and which were reported as due to secondary infection, were really due to the same source as the original case, or to primary infection.

An insanitary condition of premises, on which a case of typhoid fever occurred, would be considered a cause of typhoid fever only in so far as it might assist in the development and distribution of the germs of the disease. Thus, a badly constructed or neglected privy or cesspool might be an eyesore or a source of discomfort to those in the immediate vicinity for many years, and yet not be a cause of typhoid fever. Further, the leachings from such privy or cesspool might find their way into and contaminate the water supply, and the water be consumed without any apparent danger to those using it. But with the entrance to such privy or cesspool of the discharges from a person suffering, or recently recovered, from typhoid fever, these receptacles would then become centers of infection, and a positive danger to those living in their immediate vicinity, and to those using the water from any source into which the leachings from such receptacles might find their

way. It is probable that very many of the 1,402 cases of typhoid fever in Table 40, attributed to insanitary surroundings, were due to infected water, and, in some instances, to infected milk or other food.

Cases of typhoid fever due to infected food are difficult to trace, and it is probable that the one per cent of cases, shown in Table 40, attributed to this source, does not nearly represent the actual number of cases resulting therefrom.

The cases of typhoid fever due to milk infection are probably represented to a considerable extent by the numbers of deaths from this disease in children under five years of age; and which constitute about four and one-half per cent of all the deaths from this disease.

The transmission of typhoid fever by flies is believed to play a more important part in the spreading of this disease than is generally supposed, but the connection between this source and individual cases of the disease cannot ordinarily be traced by those in charge of the public health service of the State. Wherever a common privy exists, there will always be a possibility of the infection of the contents of the pit by the discharges from an incipient or ambulatory case of typhoid fever, and a strong probability of its infection during and for some time subsequent to an outbreak of this disease on the premises where the privy is located. As there is little, if any, effort made to exclude the common house-fly from the common privies, and, in many instances, a very imperfect exclusion of them from our homes, from stores where articles of food are exposed for sale, and from the rooms where cases of typhoid fever are present, the probability of infection of food in the home and in the store is ever present.

It is possible that some of the nineteen cases of typhoid fever, in Table 40, attributed to infected houses and articles of clothing, etc., were really due to infection in a well, privy or cesspool, rather than to infection in the house itself.

TABLE 40.—*The principal reported sources of contagium in 17,906 cases of typhoid fever in Michigan in the sixteen years, 1891-1906.*

Reported sources.	Number of cases.	Per cent of cases in which the source was known.
Water and ice.....	10,401	58.1
Outside jurisdictions.....	3,246	18.1
Traced to former cases in same locality.....	2,570	14.4
Insanitary surroundings (defective sewerage, filth, etc.).....	1,402	7.8
Milk and other foods.....	230	1.3
Flies.....	38	.2
Infected houses, and articles of clothing, etc.....	19	.1
Source not stated or doubtful*,.....	32,282	† 64.3

\*In each year, many cases in this group belonged to outbreaks which began in a preceding year, and the source of contagium may have been traced and reported when the outbreak first began.

†Per cent of all cases which were reported.

TABLE 41—Localities from which and to which typhoid fever was spread, during the year 1906.

Spread from:	To:	Spread from:	To:
Alpena County, Alpena City.	Presque Isle County, Onaway City.	Delta County, Escanaba City.	Dickinson County, Breen Township.
Antrim County, Elk Rapids Village.	Grand Traverse County, Traverse City.	Emmet County, McKinley Township.	Oscoda County, Tustin Village.
Baraga County, Baraga Village.	Marquette County, Marquette City.	Genesee County, Flint City.	Lapeer County, Lapeer Township.
Bay County, Bay City.	Bay County, Pinconning Township.	Genesee County, Flint City.	Tuscola County, Novesta Township.
Bay County, Merritt Township.	Tuscola County, Gilford Township.	Grand Traverse County, (Locality not given).	Mecosta County, Hinton Township.
Bay County, Pinconning Village.	Gladwin County, Gladwin City.	Grand Traverse County, Traverse City.	Allegan County, Dorr Township.
Benzie County, Frankfort Village.	Antrim County, Helena Township.	Grand Traverse County, Traverse City.	Antrim County, Milton Township.
Berrien County, Benton Harbor City.	Cass County, Dowagiac City.	Grand Traverse County, Traverse City.	Kalamazoo County, Kalamazoo City.
Calhoun County, Battle Creek City.	Kalamazoo County, Vicksburg Village.	Grand Traverse County, Traverse City.	Kalamazoo County, Wakeshma Township.
Calhoun County, Battle Creek City.	Kent County, Courtland Township.	Grand Traverse County, Traverse City.	Leelanau County, Elmwood Township.
Cass County, Dowagiac City.	Berrien County, Eau Claire Village.	Grand Traverse County, Traverse City.	Manistee County, Manistee City.
Charlevoix County, Charlevoix Village.	Crawford County, Maple Forest Township.	Grand Traverse County, Traverse City.	Wexford County, Cadillac City.
Cheboygan County, (Camp).	Presque Isle County, Onaway City.	Gratiot County, Ithaca Village.	Gratiot County, North Star Township.
Cheboygan County, Cheboygan City.	Emmet County, Harbor Springs Village.	Gratiot County, (Locality not given).	Hillsdale County, Waldron Village.
Cheboygan County, Forest Township.	Presque Isle County, Belknap Township.	Hillsdale County, Hillsdale City.	Calhoun County, Albion City.
Cheboygan County, Forest Township.	Wexford County, Cadillac City.	Houghton County, Houghton Village.	Livingston County, Unadilla Township.

TABLE 41.—CONTINUED.

Spread from :	To :	Spread from :	To :
Ingham County, Lansing City.	Hillsdale County, Pittsford Township.	Kent County, Grand Rapids City.	Hillsdale County, Ransom Township.
Ingham County, Lansing City.	Ingham County, Alaiedon Township.	Kent County, Grand Rapids City.	Ingham County, Mason City.
Ingham County, Lansing City.	Ingham County, Meridian Township.	Kent County, Grand Rapids City.	Kent County, Alpine Township.
Ingham County, Lansing City.	Ionia County, Sebewa Township.	Kent County, Grand Rapids City.	Kent County, Sparta Village.
Ingham County, Lansing City.	Saginaw County, Brady Township.	Kent County, Grand Rapids City.	Montealm County, Maple Valley Township.
Ingham County, Lansing City.	Shiawassee County, Laingsburg Village.	Kent County, Grand Rapids City.	Muskegon County, Montague Village.
Ingham County, Lansing City.	Shiawassee County, Owosso City.	Kent County, Grand Rapids City.	Newaygo County, Grant Village.
Ingham County, Lansing Township.	Griat County, Hamilton Township.	Kent County, Grand Rapids City.	Oceana County, Golden Township.
Ionia County, Lake Odessa Village.	Ionia County, Campbell Township.	Kent County, Grand Rapids City.	Oceana County, Shelby Township.
Isabella County, Wise Township.	Clare County, Farwell Village.	Kent County, Grand Rapids City.	Ottawa County, Zeeland Township.
Kalamazoo County, Kalamazoo City.	St. Joseph County, Park Township.	Kent County, Grand Rapids City.	St. Joseph County, Constantine Township.
Kalamazoo County, Kalamazoo City.	Van Buren County, Arlington Township.	Kent County, Grand Rapids Township.	Kent County, Grand Rapids City.
Kalamazoo County, Kalamazoo City.	Van Buren County, Bangor Township.	Lenawee County, Adrian City.	Hillsdale County, Pittsford Township.
Kalkaska County, Boardman Village.....	Kalkaska County, Kalkaska Village.	Lenawee County, Tecumseh Village.	Lenawee County, Seneca Township.
Kent County, Grand Rapids City.	Allegan County, Dorr Township.	Marquette County, Forsyth Township.	Marquette County, Marquette City.
Kent County, Grand Rapids City.	Grand Traverse County, Traverse City.	Marquette County, Powell Township.	Marquette County, Marquette City.

TABLE 41.—CONTINUED.

Spread from:	To:	Spread from:	To:
Mason County, Custer Township.	Mason County, Ludington City.	Ontonagon County, Rockland Township.	Ontonagon County, Ontonagon Township.
Mason County, Ludington City.	Mason County, Custer Township.	Ontonagon County, Rockland Township.	Ontonagon County, Ontonagon Village.
Mecosta County, Millbrook Township.	Mecosta County, Big Rapids City.	Oseola County, (Locality not given).	Calhoun County, Eckford Township.
Menominee County, Menominee City.	Menominee County, Daggett Village.	Otsego County, Gaylord Village.	Mecosta County, Big Rapids City.
Missaukee County, Richland Township.	Wexford County, Cadillac City.	Ottawa County, Grand Haven City.	Kent County, Vergennes Township.
Monroe County, Milan Township.	Monroe County, London Township.	Ottawa County, Holland City.	Ottawa County, Holland Township.
Montcalm County, Douglass Township.	Montcalm County, Day Township.	Ottawa County, Holland City.	Ottawa County, Zeeland Township.
Muskegon County, Norton Township.	Muskegon County, Muskegon City.	Presque Isle County, Bismark Township.	Presque Isle County, Rogers City Village.
Newaygo County, Croton Village.	Mecosta County, Mecosta Township.	St. Clair County, Port Huron City.	Jackson County, Jackson City.
Newaygo County, Croton Village.	Mecosta County, Morley Village.	St. Clair County, Port Huron City.	Macomb County, Richmond Township.
Newaygo County, Croton Village.	Ottawa County, Crockerly Township.	St. Clair County, Port Huron City.	St. Clair County, Kenockee Township.
Oakland County, Pontiac City.	Oakland County, Waterford Township.	St. Joseph County, Mendon Village.	Kalamazoo County, Kalamazoo City.
Oakland County, Rochester Village.	Oakland County, Holly Village.	St. Joseph County, Sturgis City.	Kalamazoo County, Kalamazoo City.
Oceana County, Pentwater Village.	Oceana County, Golden Township.	Tuseola County, Gilford Township.	Bay County, Merritt Township.
Ontonagon County, Greenland Township.	Schoolcraft County, Manistique City.	Upper Peninsula, (Locality not given).	Antrim County, Echo Township.
Ontonagon County, Ontonagon Village.	Ontonagon County, Ontonagon Township.	Upper Peninsula, (Locality not given).	Emmet County, Alanson Village.

TABLE 41.—CONTINUED.

Spread from:	To:	Spread from:	To:
Van Buren County, Bangor Village.	Van Buren County, Arlington Township.	Wexford County, Boon Township.	Clare County, Farwell Village.
Van Buren County, Paw Paw Township.	Van Buren County, Paw Paw Village.	Wexford County, Boon Township.	Clare County, Surrey Township.
Van Buren County, Paw Paw Village.	Kalamazoo County, Kalamazoo City.	Wexford County, Cadillac City.	Mecosta County, Martiny Township.
Van Buren County, Paw Paw Village.	Washtenaw County, Ann Arbor City.	Wexford County, Cadillac City.	Wexford County, Clam Lake Township.
Washtenaw County, Milan Village.	Washtenaw County, Ann Arbor City.	Wexford County, Springville Township.	Manistee County, Manistee City.
Wayne County, Detroit City.	Antrim County, Elk Rapids Village.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Wayne County, Detroit City.	Eaton County, Charlotte City.	Spread from:	To:
Wayne County, Detroit City.	Jackson County, Grass Lake Township.	Alabama, (Locality not given).	Clare County, Farwell Village.
Wayne County, Detroit City.	Lapeer County, Oregon Township.	Canada, (Locality not given).	Cass County, Cassopolis Village.
Wayne County, Detroit City.	Macomb County, Erin Township.	Canada, (Locality not given).	Jackson County, Jackson City.
Wayne County, Detroit City.	Ottawa County, Grand Haven City.	Canada, (Locality not given).	Kent County, Grattan Township.
Wayne County, Detroit City.	Washtenaw County, Lima Township.	Colorado, Denver.	Jackson County, Jackson City.
Wayne County, Trenton Village.	Kalamazoo County, Vicksburg Village.	Georgia, (Locality not given).	Berrien County, Coloma Village.
Wayne County, Wyandotte City.	Monroe County, Berlin Township.	Idaho, (Locality not given).	Cass County, Silver Creek Township.
Wayne County, Wyandotte City.	Monroe County, La Salle Township.	Illinois, Chicago.	Allegan County, Saugatuck Township.
Wayne County, Wyandotte City.	Oakland County, Milford Village.	Illinois, Chicago.	Berrien County, Benton Township.

TABLE 41.—CONTINUED.

Spread from:	To:	Spread from:	To:
Illinois, Chicago.	Berrien County, New Buffalo Township.	Minnesota, (Locality not given).	Houghton County, Chassell Township.
Illinois, Chicago.	Berrien County, Watervliet Township.	New York, (Locality not given).	Kalamazoo County, Kalamazoo City.
Illinois, Chicago.	Berrien County, Watervliet Village.	New York, (Locality not given).	Oakland County, Highland Township.
Illinois, Chicago.	Delta County, Gladstone City.	New York, New York.	Macomb County, Mt. Clemens City.
Illinois, Chicago.	Hillsdale County, Hillsdale City.	New York, Watertown.	Kalamazoo County, Kalamazoo City.
Illinois, Chicago.	Muskegon County, Muskegon City.	Ohio, Clay Center.	Monroe County, Petersburg Village.
Illinois, Chicago.	Van Buren County, Covert Township.	Ohio, (Locality not given).	Branch County, Bronson Township.
Illinois, Evanston.	Kalamazoo County, Kalamazoo City.	Ohio, (Locality not given).	Gratiot County, Wheeler Township.
Illinois, (Locality not given).	Oceana County, Hart Village.	Ohio, (Locality not given).	Kent County, Grattan Township.
Illinois, Winetta.	Allegan County, Laketown Township.	Ohio, (Locality not given).	Lenawee County, Madison Township.
Indiana, Indiana Harbor.	Calhoun County, Battle Creek City.	Ohio, (Locality not given).	Washtenaw County, Ann Arbor City.
Indiana, (Locality not given).	Calhoun County, Albion City.	Ohio, Toledo.	Hillsdale County, Hillsdale City.
Indiana, (Locality not given).	Eaton County, Grand Ledge City.	Ohio, Toledo.	Jackson County, Hanover Village.
Indiana, South Bend.	Cass County, Dowagiac City.	Ohio, Toledo.	Jackson County, Jackson City.
Indiana, South Bend.	Washtenaw County, Ann Arbor City.	Ohio, Toledo.	Monroe County, Bedford Township.
Minnesota, Hibbing.	Marquette County, Marquette City.	Ohio, Toledo.	Monroe County, Berlin Township.



TABLE 41.—CONCLUDED.

Spread from :	To :	Spread from :	To :
Ohio, Toledo.	Monroe County, Ida Township.	Washington (State) (Locality not given).	Isabella County, Coe Township.
Ohio, Toledo.	Monroe County, Summerfield Township.	Washington (State) (Locality not given).	Ottawa County, Holland Township.
Ontario, (Locality not given).	Isabella County, Mt. Pleasant City.	Wisconsin, (Locality not given).	Jackson County, Jackson City.
Texas, (Locality not given).	Berrien County, Niles Township.	Wisconsin, Niagara.	Dickinson County, Norway City.

## RESTRICTIVE AND PREVENTIVE MEASURES.

Table 42 indicates that, in 1905-6, in a large number of instances, the disinfection of the discharges, and of clothing and other articles soiled by the discharges, of typhoid fever patients, was enforced. This is very gratifying, because it is mainly through the discharges that the disease is spread. This does not, however, include the discharges from patients prior to the recognition of the disease and for some time subsequent to apparent recovery, nor the discharges from ambulatory cases which are seldom, if ever, recognized, all of which are believed to be fruitful sources of the disease.

The disinfection of rooms in which the patients were sick was enforced in sixty-two per cent of the cases. This shows a much greater recognition of the importance of this precautionary measure than was reported in the single year 1905.

Judging by the per cent of cases in which the isolation of the patient was enforced, the necessity for this restrictive measure is quite generally recognized. This is also true, though to a less extent, in respect to the placarding of premises. It is sometimes urged that if proper precautions are taken in the care of typhoid fever patients the isolation of the sick and the placarding of premises are not necessary. To this it should be stated, that inasmuch as strict precautions are not always observed in such cases, and for the further reason that many prominent medical men, in this and other countries, are advocates of the theory of the communicability of typhoid fever directly from patient to nurse, and to others who may come in contact with them, members of the families of those sick, other than those who may be in attendance upon the sick, should be excluded from the sick room, and the public should be warned against visiting the houses, and especially against drinking the water from any wells or making use of any outhouses on the premises where the disease is present.

TABLE 42.—*Restrictive and preventive measures in typhoid fever, in Michigan, in 1905 and 1906.*

Restrictive and preventive measures.	Number of cases.	Per cent of all cases.
<b>PLACARDING OF PREMISES:</b>		
Enforced.....	3,925	66
Neglected.....	1,093	18
Not stated, or statements doubtful.....	919	16
<b>ISOLATION OF SICK PERSONS:</b>		
Enforced.....	4,284	72
Neglected.....	644	11
Not stated, or statements doubtful.....	1,009	17
<b>DISCHARGES FROM THE BOWELS AND BLADDER:</b>		
Disinfected.....	4,543	76
Not disinfected.....	332	6
Not stated, or statements doubtful.....	1,062	18
<b>CLOTHING AND OTHER ARTICLES SOILED BY DISCHARGES:</b>		
Disinfected.....	4,853	82
Not disinfected.....	101	2
Not stated, or statements doubtful.....	983	16
<b>INFECTED ROOMS:</b>		
Disinfected.....	3,652	62
Not disinfected.....	956	16
Not stated, or statements doubtful.....	1,329	22
<b>DRINKING WATER:</b>		
Boiled during the period of sickness.....	1,567	* 26
Not boiled.....	3,026	* 51
Not stated, or statements doubtful.....	1,344	23
<b>PROTECTION AGAINST FLIES:</b>		
Houses screened during fly time.....	† 2,818	67
Not screened.....	† 442	10
Not stated, or statements doubtful.....	† 951	23

\*There were 454 cases definitely traced, or believed to have been due, to infected water in the localities where the patients resided, and in 138 (30 per cent) of these instances the boiling of the drinking water was carried out, and neglected in 263 (58 per cent).

†Of the 5,937 cases of typhoid fever in the years 1905 and 1906, 1,726 occurred in months when there were no flies, consequently no necessity for screening; therefore, the 1,726 cases are not included in these figures.

As indicated in the footnote of Table 42, the boiling of the drinking water, in cases where the water supplies were believed to have been the sources of the typhoid fever, was carried out in less than one-third of the cases. The boiling of suspected water, for strictly drinking purposes, does not entail much time or labor, and is an absolute safeguard against the communication of typhoid fever through this agency. There is an objection, however, especially in very warm weather, to the drinking of water which has been boiled and thus rendered insipid, but the protection which the boiling affords should more than offset any objection of this nature.

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### WARNING RELATIVE TO TYPHOID FEVER.

In August, 1906, copies of the following circular were mailed to the Editors of over four hundred Michigan newspapers, with the request that they publish the same in their papers:

#### DROUTH VS. TYPHOID FEVER. AS CAUSE AND EFFECT.

The recent extreme dry spell the past month, in nearly every section of the State, causing in some places almost a water famine, prompts us to call attention to the danger arising from this condition. When public water supply from any source becomes limited, many will resort to surface wells for home consumption and in times like the present the danger is aggravated, for typhoid and other disease germs are more apt to be present under such conditions than when there is an abundance of water.

Bear in mind that the water we drink is the most common means for conveying germs of typhoid fever and kindred diseases into the system, and it should be generally understood that the health of a whole neighborhood or community may be endangered by the careless disposal of discharges from a typhoid fever patient. Therefore, when a case of typhoid fever exists in a community thoroughly disinfect all the discharges before disposing of the same.

Another precaution to be observed, if water in your wells is low, or for any other reason is not absolutely above suspicion, is to boil the same before using for drinking and culinary purposes; this especially is true of all water from shallow wells.

Ice for cooling and freezing purposes is all right, but ice put into drinking water, tea, etc., is not safe for the reason that most of it is taken from the streams, lakes and rivers that are contaminated by sewage and other impurities. One of the worst epidemics of typhoid fever ever experienced in Michigan was traceable directly to the ice supply.

Another medium for conveying the infection is the fly. Screen your kitchens, dining-rooms and food from it; keep it out and you will keep out disease.

As typhoid fever is most prevalent at this time of the year and later, these precautions should be observed.

Report promptly to the health officer any case of this disease you know of.

A pamphlet containing more full and complete suggestions and recommendations for the restriction and prevention of typhoid fever is issued by this Department and may be obtained, without cost, by addressing the Secretary, Lansing, Michigan.

State Department of Health,  
Lansing, Mich., August, 1906.

## REPORT RELATIVE TO TYPHOID FEVER AT THE STATE INDUSTRIAL SCHOOL FOR BOYS, LANSING.

On October 29, 1906, Dr. F. W. Shumway, Secretary, and T. S. Ainge, Sanitary Engineer, of the State Department of Health, in company with H. H. Larned, member of the Board of Trustees, and Dr. J. H. Wellings, Physician, of the State Industrial School for Boys, visited that institution with the view of ascertaining the source of the present outbreak of typhoid fever in the school.

A visit was made to the farm, east of the school, and the basements of several of the cottages and of the Hospital building were inspected.

On the farm it was found that water had collected in several low places, forming large stagnant pools, to one of which the cattle had access at that time. For the purpose of draining two of these low places, borings into the subsoil have been made, and a large quantity of very foul, and possibly infected, water has been discharged into the substrata, and is believed to have found its way into the well from which, up to a short time ago, the school derived its water for drinking and other purposes. Analyses of the water from this well have shown it to be impure and unsafe, and the fact that it had the characteristic color and odor of water contaminated by manure is very good evidence of its pollution by the drainage of the low places on the farm.

The water from the well is now being pumped into the sewers, and city water used for all purposes.

It is reasonable to conclude that the well water was the source of the present outbreak of typhoid fever, and, with the precautions which are being taken to prevent the spread of the disease, no new cases should occur.

For the further study of this outbreak, it is recommended that analyses be made of the city water, now being distributed to the buildings through the same pipes which recently conveyed the contaminated well water; also, that a sufficient number of analyses of the milk supply be made, to show, beyond doubt, that it is not contaminated or infected.

For the purpose of rendering impossible the spread of the disease from the Hospital, in addition to the precautions being taken there, it is suggested that children, not sick from typhoid fever, requiring treatment by the physician or matron, be not permitted to mingle with those sick or convalescent from typhoid fever, and that the isolation of the latter be made as complete as possible.

A superficial inspection of the sewerage system of the institution, and of several of the buildings, revealed the fact that many changes are necessary, principally the need of foot vents, or fresh air openings, on the house side of each of the main traps in the sewers of the several buildings. These openings should be as far as practicable from the buildings, because air will be temporarily driven out of them during the discharge of fixtures in the buildings.

In the basement of the Hospital building there is an opening, with a loose fitting cover, in the crock sewer under the floor, into which soil and waste pipes from above discharge. It is believed there is a trap in this sewer at some point before it joins the main sewer, and therefore the passage into the building, through the opening in the basement, of air from the main sewer is not probable. There is, however, the danger from foul, and possibly infected, air from the soil pipes and the sewer under the floor being driven into the basement whenever a fixture is used. It is recommended that the sewer under the floor be discontinued, and that all the soil and waste pipes be suspended from the joists under the first floor and carried on walls to the point where the sewer enters the building. At this point there should be a main trap, with fresh air opening, as previously suggested.

There is a disused fitting in an iron vent pipe in the toilet room on the first floor of the Hospital, the opening in which has been filled by a wooden plug, and as this plug may not now be perfectly tight, and may shrink and become loose, and so allow air to pass from the pipe into the rooms nearby, it is recommended that this plug be replaced by a metal cap, properly caulked into the hub of the fitting with lead.

Two manholes, which apparently assist in the ventilation of the main sewer on Pennsylvania avenue, were found on the north and south sides and very close to the McKinley Cottage, and as these manholes are open at the top, there is a probability of foul air being discharged from them and entering the building through windows nearby which may be open. As there are manholes in the

main sewer on Pennsylvania avenue for the ventilation of the same, it is recommended that the manholes close to the McKinley Cottage be tightly covered, so that no air can escape from them.

With the exception of a closet in Cottage No. 4, the flushing tank of which was temporarily out of order, the closets and urinals inspected were found to be clean and free from objectionable odors.

There is a sewer manhole in the kitchen for receiving the surface and other water from the kitchen and for flushing the sewer at that point, and it was stated that there is a trap between this manhole and the main sewer outside, notwithstanding which there may be an accumulation of grease and other foul matters on the bottom and sides of the manhole and sewer from the same sufficient to contaminate the air of the kitchen, and articles of food therein, whenever the cover of the manhole is raised. It is recommended that this manhole be dispensed with, and that the drainage from the kitchen be through well trapped pipes, into a manhole, with a grated cover, outside the building, and that the trap between the manhole and the sewer be placed near to and accessible from the manhole, so that grease, etc., can be easily and quickly removed in case of stoppage.

It is suggested that, as soon as practicable, a plan of the entire sewerage system be prepared, and that the plan show the location of every main trap, many of which cannot be easily located.

F. W. SHUMWAY,  
*Secretary.*

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## DIPHTHERIA AND CROUP IN MICHIGAN IN 1906 AND PRECEDING YEARS.

### GENERAL PREVALENCE.

During the year 1906, diphtheria was reported present in 2,642 households, with totals of 3,648 cases and 453 deaths, an average of 1.38 cases and .17 deaths per household.

In 1906, compared with the average for the twelve years, 1894-1905, the number of cases were 525 more, and the deaths 128 less.

By reference to Table 43, it may be seen that in the thirteen years, 1894-1906, the average numbers of cases and deaths, the average deaths per 100 cases, and the average death rate per 100,000 of the population, were much less than the average for the ten preceding years. The reason for this decrease will be considered in connection with Table 51, on a subsequent page of this article.

Going back still further, by reference to Table 44, we find that in the 15 years, 1869-1883, the average death rate was about 58.5 per 100,000 of the population, a rate not equalled in any subsequent year. This high rate was due to the unusual rates for each of the years 1879-1882, the maximum of 145.2 deaths per 100,000 being reached in 1881. In the last year named, active measures for the restriction of diphtheria were begun by the State Department of Health, and the Tables 43 and 44 show a much lower death rate for each year since that time, especially in the last nine years.

TABLE 43.—*The prevalence of diphtheria, in Michigan, during the ten years, 1884-1893, and before the use of antitoxin; also a similar statement for the thirteen years, 1894-1906, since the beginning of the general use of antitoxin.*

Years.	Population. (Estimated for intercensal years.)	Reported cases.	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884.....	1,853,658	3,915	905	23.1	48.8
1885.....	1,893,697	4,018	964	24.0	50.9
1886.....	1,933,735	4,244	982	23.1	50.8
1887.....	1,973,774	3,382	825	24.4	41.8
1888.....	2,013,812	2,228	532	23.9	26.4
1889.....	2,053,851	3,157	683	21.6	33.3
1890.....	2,093,889	4,206	1,050	25.0	50.1
1891.....	2,130,827	4,385	1,002	22.9	47.0
1892.....	2,167,765	4,818	1,099	22.8	50.7
1893.....	2,204,703	4,736	1,092	23.1	49.5
Averages 1884-1893.....	2,031,971	3,909	913	23.4	44.9
1894.....	2,241,641	3,852	744	19.3	33.2
1895.....	2,271,531	3,433	708	20.6	31.2
1896.....	2,301,421	4,013	757	18.9	32.9
1897.....	2,331,311	4,132	756	18.3	32.4
1898.....	2,361,201	2,357	477	20.2	20.2
1899.....	2,391,091	2,154	435	20.2	18.2
1900.....	2,420,982	2,706	528	19.5	21.8
1901.....	2,450,872	2,498	493	19.7	20.1
1902.....	2,475,499	2,993	500	*16.4	20.2
1903.....	2,502,758	3,670	569	15.5	22.7
1904.....	2,530,016	3,510	538	15.3	21.3
1905.....	2,557,275	2,159	465	21.5	18.2
1906.....	2,584,533	3,648	453	12.4	17.5
Averages 1894-1906.....	2,416,933	3,163	571	18.0	23.6

\*Exclusive of the cases in the cities of Muskegon and Sault Ste. Marie, from which only the fatal cases were reported in this year.

TABLE 44.—*The number of deaths from diphtheria and croup, in Michigan, per 100,000 persons living, in each of the fifteen years, 1869-1883. Compiled from reports to the Secretary of State.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	17.0	20.9	22.5	23.2	29.6	26.2	26.9	34.7	50.6	72.8	110.5
Years.....	1880.	1881.	1882.	1883.	Average. 1869-1883.						
Deaths.....	113.9	145.2	102.1	75.7	58.5						

GEOGRAPHICAL DISTRIBUTION IN DIPHTHERIA.

Table 45 shows that, as indicated by the numbers of cases and deaths per 100,000 of the population in the sixteen years, 1891-1906, diphtheria was much more prevalent than the average for the entire State (145.2 cases and 28.0 deaths per 100,000) in the Northeastern and South-eastern divisions.

The counties in which the case and death rates from diphtheria were both unusually high in the sixteen years, 1891-1906, are:

Roscommon*.....	with rates of 658 cases and 179.5 deaths per 100,000	
Gogebic.....	" " " 278	" " " 44.2
Midland.....	" " " 276	" " " 42.5
Wayne.....	" " " 272	" " " 59.8
Cheboygan.....	" " " 272	" " " 51.7
Bay.....	" " " 265	" " " 44.5
Marquette.....	" " " 227	" " " 35.2
Arenac.....	" " " 224	" " " 35.3
Iosco.....	" " " 219	" " " 43.8
Alpena.....	" " " 213	" " " 42.6
Huron.....	" " " 213	" " " 41.4
Dickinson.....	" " " 208	" " " 35.6
Otsego.....	" " " 205	" " " 51.4
Montmorency.....	" " " 200	" " " 66.8
Presque Isle.....	" " " 200	" " " 50.0
Lake.....	" " " 182	" " " 36.3
Alcona.....	" " " 179	" " " 53.8

\*The amazingly high rates in this county were due to a case of so-called sore throat in 1903, of which particulars were given in the annual report of this Department for 1894. The high rates in other counties were due, in the main, to epidemics in one or more of the sixteen years for which the rates are computed.

In the counties of Kalkaska and Shiawassee, the case rates were unusually high but the death rates were but slightly higher than the average for the entire State.

TABLE 45.—*The geographical distribution of diphtheria, in Michigan, in the sixteen years, 1891-1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical division.	Average.			
	Population.	Cases.	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	239,659	361.6	63.5	26.5
Alger county.....	4,609	3	.6	13.0
Baraga county.....	4,663	.9	.2	4.3
Chippewa county.....	18,649	*14	4	21.4
Delta county.....	22,846	19	4	17.5
Dickinson county.....	16,832	35	6	35.6
Gogebic county.....	15,842	44	7	44.2
Houghton county.....	56,312	83	14	24.9
Iron county.....	6,848	8	2	29.2
Keweenaw county.....	3,350	5	.9	26.9
Luce county.....	2,956	.7	.3	10.1
Mackinac county.....	7,656	3	.5	6.5
Marquette county.....	39,724	90	14	35.2
Menominee county.....	25,081	42	7	27.9
Ontonagon county.....	6,373	7	1	15.7
Schoolcraft county.....	7,918	7	2	25.3
NORTHWESTERN DIVISION.	83,270	82	14.9	17.9
Benzie county.....	9,434	8	.9	9.5
Grand Traverse county.....	20,188	19	4	19.8
Leelanau county.....	10,207	10	2	19.6
Manistee county.....	27,048	26	5	18.5
Wexford county.....	16,393	19	3	18.3
NORTHERN DIVISION.	72,291	86	17.6	24.3
Artrim county.....	14,225	5	2	14.1
Charlevoix county.....	13,287	5	1	7.5
Cheboygan county.....	15,460	42	8	51.7
Crawford county.....	3,117	4	.7	22.5
Emmet county.....	13,826	5	.9	6.5
Kalkaska county.....	6,536	13	2	30.6
Otsego county.....	5,840	12	3	51.4
NORTHEASTERN DIVISION.	55,655	104	23.2	41.7
Alcona county.....	5,579	10	3	53.8
Alpena county.....	18,770	40	8	42.6
Iosco county.....	11,407	25	5	43.8
Montmorency county.....	2,996	6	2	66.8
Ogemaw county.....	7,088	6	.9	12.7
Oscoda county.....	1,814	1	.3	16.5
Presque Isle county.....	8,001	16	4	50.0
WESTERN DIVISION.	268,422	367	69	25.7
Kent county.....	130,032	213	39	30.0
Lake county.....	5,504	10	2	36.3
Mason county.....	19,171	20	4	20.9
Muskegon county.....	37,308	*62	11	29.5
Newaygo county.....	18,717	10	2	10.7
Oceana county.....	17,130	12	3	17.5
Ottawa county.....	40,560	40	8	19.7
NORTHERN CENTRAL DIVISION.	100,458	116	21.3	21.2
Clare county.....	8,519	9	2	23.5
Gladwin county.....	6,419	2	.3	4.7
Isabella county.....	22,835	22	3	13.1
Mecosta county.....	20,761	15	3	14.5
Midland county.....	14,128	39	6	42.5
Missaukee county.....	8,543	5	1	11.7
Osceola county.....	17,582	13	3	17.1
Roscommon county.....	1,671	11	3	179.5

\* This footnote is below Table 43, on a preceding page.



TABLE 45.—CONCLUDED.

Geographical division.	Average.			
	Population.	Cases.	Deaths.	Death rates.
<b>BAY AND EASTERN DIVISION.</b>	341,768	595	104	30.4
Arenac county.....	8,491	19	3	35.3
Bay county.....	62,982	167	28	44.5
Huron county.....	33,853	72	14	41.4
Lapeer county.....	28,094	34	6	21.4
Saginaw county.....	83,428	142	24	28.8
Sanilac county.....	34,613	44	9	26.0
St. Clair county.....	54,920	85	16	29.1
Tuscola county.....	35,387	32	4	11.3
<b>CENTRAL DIVISION.</b>	283,020	277	47	16.6
Barry county.....	22,984	16	3	13.1
Clinton county.....	25,740	18	4	15.5
Genesee county.....	41,521	40	7	16.9
Gratiot county.....	29,611	13	3	10.1
Ingham county.....	41,253	57	9	21.8
Ionia county.....	34,872	18	4	11.5
Livingston county.....	19,760	18	3	15.2
Montcalm county.....	33,843	20	4	11.8
Shiawassee county.....	33,496	77	10	29.9
<b>SOUTHWESTERN DIVISION.</b>	140,251	103	24	17.1
Allegan county.....	39,111	25	6	15.3
Berrien county.....	47,745	47	10	20.9
Cass county.....	20,768	14	3	14.4
Van Buren county.....	32,627	17	5	15.3
<b>SOUTHERN CENTRAL DIVISION.</b>	316,804	274	46	14.5
Branch county.....	26,368	16	5	19.0
Calhoun county.....	49,942	59	9	18.0
Hillsdale county.....	30,010	26	3	10.0
Jackson county.....	47,109	41	10	21.2
Kalamazoo county.....	45,184	62	6	13.3
Lenawee county.....	48,720	34	7	14.4
St. Joseph county.....	24,297	9	1	4.1
Washtenaw county.....	45,174	27	5	11.1
<b>SOUTHEASTERN DIVISION.</b>	444,519	1,052	229	51.5
Macomb county.....	32,770	51	11	33.6
Monroe county.....	33,104	57	11	33.2
Oakland county.....	44,043	34	7	15.9
Wayne county.....	334,602	910	200	59.8

## THE PREVALENCE OF DIPHTHERIA IN URBAN AND RURAL LOCALITIES IN 1906.

Table 46 indicates that, in 1906, with the exception of one group of localities (cities and villages under 5,000 inhabitants), diphtheria was most prevalent in the large centers of population and least prevalent in the rural localities.

The very high death rates from diphtheria, in 1906, in the cities of Mt. Clemens, Ludington and St. Joseph, shown below, were probably responsible for the greater death rate in group four, of Table 46, than the death rate of the more densely populated localities in group three.

In the groups of urban localities of more than 5,000 inhabitants,

shown in Table 46, the localities which had unusually high death rates from diphtheria in 1906 are as follows:

Mt. Clemens.....	149.2	deaths per	100,000	persons living
Ludington .....	82.1	"	"	"
Flint .....	76.1	"	"	"
Port Huron .....	58.6	"	"	"
Grand Rapids.....	54.1	"	"	"
Saginaw .....	43.3	"	"	"
St. Joseph .....	37.0	"	"	"
Jackson .....	31.5	"	"	"
Calumet township .....	28.0	"	"	"
Detroit .....	26.7	"	"	"
Muskegon .....	23.9	"	"	"
Kalamazoo .....	21.6	"	"	"

The localities in group five and in the group of rural localities, in Table 46, in which diphtheria was unusually prevalent in 1906, are as follows:

ALCONA COUNTY—Curtis township; ALLEGAN COUNTY—Villages of Plainwell and Saugatuck; BERRIEN COUNTY—Bainbridge township; BAY COUNTY—Kawkawlin township; CASS COUNTY—Porter township; CHARLEVOIX COUNTY—Charlevoix village; CHEBOYGAN COUNTY—Munro township; CHIPPEWA COUNTY—Bruce township; CRAWFORD COUNTY—Grayling village; DELTA COUNTY—Garden township; DICKINSON COUNTY—Township and city of Norway; GENESEE COUNTY—Townships of Genesee and Vienna, and village of Clio; GOGEBIC COUNTY—Ironwood township; HILLSDALE COUNTY—Waldron village; HURON COUNTY—Townships of Lincoln and Sigel, and village of Sebawaing; IOSCO COUNTY—Reno township; IRON COUNTY—Bates township and Iron River village; ISABELLA COUNTY—Townships of Chippewa, Coldwater, Lincoln, Sherman and Vernon; KALAMAZOO COUNTY—Cooper township; KALKASKA COUNTY—Clearwater township; KENT COUNTY—Townships of Ada, Byron, Courtland, Grand Rapids, Oakfield, Plainfield, Solon and Spencer; KEWEENAW COUNTY—Grant township; LAKE COUNTY—Townships of Chase and Ellsworth, and village of Luther; LENAWEE COUNTY—Townships of Medina and Woodstock; MACOMB COUNTY—Townships of Clinton and Macomb; MANISTEE COUNTY—Townships of Bear Lake and Stronach; MASON COUNTY—Grant township; MECOSTA COUNTY—Townships of Chippewa, Deerfield, Green, Sheridan and Wheatland; MEMOMINEE COUNTY—Harris township; MIDLAND COUNTY—Ingersoll township; MISSAUKEE COUNTY—Clam Union township; MONROE COUNTY—Townships of Bedford and Exeter; MONTCALM COUNTY—Pierson township; NEWAYGO COUNTY—Townships of Croton and Ensley, and village of Fremont; OCEANA COUNTY—Townships of Leavitt, Otto and Weare; OGEMAW COUNTY—Goodar township; ONTONAGON COUNTY—Greenland township; OSCEOLA COUNTY—Townships of Hersey, Highland, Orient and Sylvan; OTTAWA COUNTY—Townships of Allendale and Crockery; SAGINAW COUNTY—Townships of Buena Vista and Zilwaukee; SANILAC COUNTY—Buel township; SCHOOLCRAFT COUNTY—Manistique city; SHIAWASSEE COUNTY—Townships of Perry and Woodhull; ST. CLAIR COUNTY—Clay township, Algonac village, and cities of Marine City and St. Clair; WAYNE COUNTY—Sumpter township and Delray village; WEXFORD COUNTY—Townships of Boon, Clam Lake, Herring, Henderson, Slagle and South Branch.

TABLE 46.—*The prevalence of diphtheria in urban and rural localities, in Michigan, in 1906.*

Localities—grouped according to density of population.	Estimated population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent. of all jurisdictions.			
Cities over 50,000.....	440,984	2	2	100	1,292	148	33.6
Cities from 25,000 to 50,000.....	147,162	4	4	100	327	40	27.2
Cities from 10,000 to 25,000 and Calumet township (17,855).....	261,286	18	16	89	475	42	16.1
Cities and villages from 5,000 to 10,000†.....	153,187	24	19	79	166	28	18.3
Cities and villages under 5,000†.....	369,743	337	114	34	306	36	9.7
Total urban.....	1,372,362	385	155	40	2,566	294	21.4
Balance of localities—principally townships‡.....	1,212,171	1,254	314	25	1,082	159	13.1

\*This footnote is below Table 43, on a preceding page.

†Exclusive of thirty-two villages in the two groups, for which the population in 1906 cannot be correctly estimated.

‡Includes the thirty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

#### THE SEASONAL PREVALENCE OF DIPHTHERIA.

For the reason that the study of the seasonal prevalence of diphtheria has been carried on by this Department for a considerable number of years, and, it is believed, a reliable basis established, and for the further reason that, in many instances, the reports to this Department give only the date when the disease began and ended in a household and not the dates when other members of the families were taken sick, the usual table relative to this phase of the study of diphtheria has been discontinued. Table 46, on page 116 of the annual report of this Department for 1906, is the latest word by this Department upon the subject.

#### THE REPORTED SOURCES OF CONTAGIUM IN DIPHTHERIA.

Table 47 indicates that the two principal ways in which diphtheria is spread are:

1. By infection from outside health jurisdictions.
2. By infection from a recent previous case in the same household or locality.

The change in the method of studying diphtheria, by *households* instead of *outbreaks*, has resulted in a very decided change in the order and importance of the two first items in Table 47 as sources of contagium in diphtheria, as may be seen by reference to the corresponding

table, and accompanying text, in the annual report of this Department for 1906.

The fact that nearly sixty per cent of the cases of diphtheria in 1906, in which a source was given, were due to infection from outside jurisdictions, is a striking example of the lack of, or imperfection, in many instances, of the local efforts for the restriction of the disease.

Were all cases of diphtheria promptly and properly isolated, and the isolation continued until the danger of infecting others was at an end, the spread of the disease from one locality to another would be a rare occurrence.

The places from which and to which diphtheria was spread in 1906 are shown in Table 48.

In the past, very many cases of diphtheria have been reported as due to exposure to persons suffering from sore throat, and other throat troubles, which, in reality, were cases of diphtheria, of a more or less mild character.

Another, and what is generally believed to be a fruitful source of contagium in outbreaks of diphtheria, is the contact of well persons with those recently recovered from the disease, but in the throats of whom the bacilli are still present.

The following instances of how diphtheria was spread in 1906 are considered worthy of special mention, and may be of interest to those engaged in the work of prevention and restriction of this and other dangerous diseases:

*Special instances of the manner in which diphtheria is often spread.*

An outbreak of diphtheria in a township in Antrim county was said to be due to a child attending school in an adjoining township, in Kalkaska county, where the disease was quite prevalent. It was reported that the disease was sometimes diagnosed "tonsillitis;" that there was a general lack of cooperation, on the part of the people, for its restriction; and that, while the disease was present in the household where the school teacher resided, the latter continued to teach and to mingle with others in public.

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Eight cases in Bainbridge township, Berrien county, were reported as due to visiting at a house in another jurisdiction where a child was suffering from "sore throat."

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Five cases of diphtheria occurred in the city of Mt. Pleasant, as the result of a case of what was pronounced "sore throat."

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Seven cases in Macomb township, Macomb county, were traced to a former case of diphtheria which was called "sore throat," and which was not treated by any physician.

Six cases and one death occurred in Little Traverse township, Emmet county, as the result of infection brought from Elkhart, Indiana. A mother and two children visited at the latter place, and one child had diphtheria very bad while there and was not entirely well when they returned to Michigan. There was a difference of opinion between the attending physician and the health officer of Little Traverse township as to the nature of the disease, and yet, after the first five cases had recovered and had been released from quarantine, a daughter who had been working away from home during the time the other members of the family were quarantined, came home soon after on a visit and was subsequently taken sick and died from what was returned by the health officer as "membraneous croup."

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Three cases and one death in Mussey township, St. Clair county, followed what was pronounced as a severe case of "tonsillitis."

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Five cases and one death occurred in Coldwater city as the result of exposure in a house in which two unrecognized cases of diphtheria existed.

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Eight cases and one death occurred in a family in Garden township, Delta county. Two deaths occurred before a physician was called. The health officer did not attend to the cases and the township board of health requested a physician to take care of the same. Several days after quarantine had been raised, a girl, who had been away from home during the quarantine, came back, and subsequently took sick and died from diphtheria. The acting health officer was not notified of this last case until too late to save the girl, the parents fearing a second quarantine.

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Nineteen cases and two deaths occurred in Clearwater township, Kalamazoo county, due to the lack of cooperation on the part of the public. The health officer reported that if the cases were mild, the people called it "tonsillitis," if severe, "diphtheria;" that they did their own quarantining and releasing from same, disinfecting, etc.; and that, when he placarded, the people would ignore the quarantine and go in and out of quarantined houses at their pleasure.

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Nine cases and one death in Chippewa township, Isabella county, resulted from a case of "tonsillitis," so-called.

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Five cases in Kalamazoo city were reported as due to infection, conveyed by means of a dog, from an itinerant gypsy camp.

Two other cases in the same city were reported as due to infection, conveyed by means of a cat, from a neighbor's family in which the disease was present.

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Seventeen cases occurred in Ensley township, Newaygo county, most of which were caused by the intermingling of residents of this township with those of the adjoining township of Pierson, Montcalm county. In one instance, a boy contracted the disease in a house in Croton township, where the disease had been present several months previous. In another instance, two cases in a household having recovered and disinfection having been carried out, the wall paper was stripped off and another case broke out in the same household.

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Three cases and one death in Millbrook township, Mecosta county, were reported as due to the children having played in an old house, where there had been diphtheria, in the adjoining township of Wheatland.

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Four cases in Bruce township, Chippewa county, were probably due to the fact that the disease was of a mild type and the cases not being reported to the local health officer. In one case, the attending physician instructed the householder to notify the health officer, which he did *by mail*. The letter, probably infected, lay in the postoffice for two weeks for lack of postage, and, in the meantime, the householder went back and forth to stores and other public places.

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Two cases in Bedford township, Monroe county, were reported as due to a case of "tonsillitis," so-called.

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Two cases and one death occurred in Sebewaing village, the first being called "tonsillitis" and the second, and fatal case, contracted from the first, being called "membraneous croup."

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Two cases in Beet Sugar Camps Nos. 1 and 2, in Orleans township, Ionia county, were due to a girl who ran away from a quarantined house in Alpena city.

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A fatal case in Attica township, Lapeer county, resulted from working at a place where the disease had been present several months previous.

Two cases and one death in Holland city were reported as due to an infected letter received from a relative in Iowa who had the disease. Both mail and parcels passed between these families during the sickness.

A case in Fork township, Mecosta county, was said to be due to the imperfectly disinfected clothing of a student from Big Rapids.

A fatal case in Macomb township, Macomb county, was reported as due to the deceased having traded mouth organs with a boy in whose family the disease had been present several months previous.

TABLE 47.—*The reported sources of contagium in diphtheria, in Michigan, in 1906, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions.....	118	58.0
Traced to former cases in same locality.....	74	36.5
Infected premises, clothing, etc.....	4	2.0
Insanitary conditions.....	2	1.0
At school.....	2	1.0
Infected by animals.....	2	1.0
Contaminated water.....	1	.5
Not stated, or statements doubtful.....	2,439	*92.3

\*Per cent of all households in which diphtheria occurred.

TABLE 48.—Localities from which and to which diphtheria was spread, during the year 1906.

Spread from:	To:	Spread from:	To:
Alcona County, Curtis Township.	Oscoda County, Mentor Township.	Delta County, Masonville Township.	Delta County, Gladstone City.
Alcona County, (Locality not given).	Iosco County, Au Sable City.	Genesee County, Flint City.	Genesee County, Vienna Township.
Alpena County, Alpena City.	Ionia County, Orleans Township.	Hillsdale County, Waldron Village.	Lenawee County, Medina Township.
Alpena County, Alpena City.	Tuscola County, Cass City Village.	Houghton County, Stanton Township.	Houghton County, Calumet Township.
Allegan County, Otsego Village.	Allegan County, Martin Township.	Ingham County, Lansing Township.	Ingham County, Vevay Township.
Arenac County, Omer City.	Midland County, Ingersoll Township.	Ingham County, Lansing City.	St. Clair County, Yale Village.
Barry County, Rockland Township.	Allegan County, Plainwell Village.	Ingham County, (Locality not given).	Jackson County, Jackson City.
Bay County, Bay City.	Bay County, Williams Township.	Isabella County, Vernon Township.	Clare County, Clare City.
Benzie County, Benzonia Township.	Benzie County, Inland Township.	Kalamazoo County, Comstock Township.	Kalamazoo County, Alamo Township.
Benzie County, Frankfort Village.	Benzie County, Benzonia Township.	Kalamazoo County, Kalamazoo City.	Ottawa County, Zeeland Township.
Berrien County, St. Joseph City.	Berrien County, Lake Township.	Kalkaska County, Clearwater Township.	Antrim County, Milton Township.
Calhoun County, Battle Creek City.	Cheboygan County, Mentor Township.	Kent County, Grand Rapids City.	Allegan County, Douglas Village.
Calhoun County, Battle Creek City.	Jackson County, Jackson City.	Kent County, Grand Rapids City.	Charlevoix County, Charlevoix City.
Charlevoix County, Charlevoix City.	Charlevoix County, Peaine Township.	Kent County, Grand Rapids City.	Clinton County, Bengal Township.
Chippewa County, Raber Township.	Alpena County, Alpena City.	Kent County, Grand Rapids City.	Isabella County, Sherman Township.
Delta County, Escanaba Township.	Delta County, Escanaba City.	Kent County, Grand Rapids City.	Kalamazoo County, Alamo Township.



TABLE 48.—CONTINUED.

Spread from:	To:	Spread from:	To:
Kent County, Grand Rapids City.	Kalamazoo County, Vicksburg Village.	Mecosta County, Big Rapids City.	Oscola County, Reed City Village.
Kent County, Grand Rapids City.	Kent County, Ada Township.	Mecosta County, Wheatland Township.	Mecosta County, Millbrook Township.
Kent County, Grand Rapids City.	Kent County, Cedar Springs Village.	Midland County, Ingersoll Township.	Saginaw County, Richland Township.
Kent County, Grand Rapids City.	Montcalm County, Greenville City.	Midland County, Midland City.	Calhoun County, Albion City.
Kent County, Grand Rapids City.	Montcalm County, Howard City Village.	Montcalm County, Edmore Village.	Mecosta County, Big Rapids City.
Kent County, Grand Rapids City.	Muskegon County, Muskegon City.	Montcalm County, Greenville City.	Montcalm County, Montcalm Township.
Kent County, Grand Rapids City.	Newaygo County, Grant Village.	Montcalm County, Pierson Township.	Newaygo County, Ensley Township.
Kent County, Grand Rapids City.	Ottawa County, Blendon Township.	Newaygo County, Croton Township.	Newaygo County, Ensley Township.
Keweenaw County, (Locality not given).	Ionia County, Ionia City.	Newaygo County, Ensley Township.	Montcalm County, Pierson Township.
Macomb County, Mt. Clemens City.	Ionia County, Ionia City.	Newaygo County, (Locality not given).	Muskegon County, Casnovia Township.
Macomb County, New Baltimore Village.	Washtenaw County, Ann Arbor City.	Oceana County, Elbridge Township.	Oceana County, Leavitt Township.
Mason County, Ludington City.	Mason County, Amber Township.	Oceana County, Hart Village.	Oceana County, Golden Township.
Mecosta County, Big Rapids City.	Mecosta County, Fork Township.	Ontonagon County, Greenland Township.	Ontonagon County, Ontonagon Village.
Mecosta County, Big Rapids City.	Mecosta County, Mecosta Township.	Oscola County, Evert Village.	Oscola County, Hersey Township.
Mecosta County, Big Rapids City.	Mecosta County, Mecosta Village.	Oscola County, Highland Township.	Oscola County, Sherman Township.
Mecosta County, Big Rapids City.	Missaukee County, Clam Union Township.	Oscola County, Marion Township.	Clare County, Redding Township.

TABLE 48.—CONTINUED.

Spread from:	To:	Spread from:	To:
Ottawa County, Tallmage Township.	Ottawa County, Allendale Township.	Wexford County, Henderson Township.	Wexford County, Cadillac City.
Saginaw County, Birch Run Township.	Genesee County, Clio Village.	Wexford County, Henderson Township.	Wexford County, South Branch Township.
Saginaw County, Saginaw City.	Tuscola County, Caro Village.	Wexford County, South Branch Township.	Wexford County, Henderson Township.
Saginaw County, Saginaw City.	Tuscola County, Wells Township.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Saginaw County, Zilwaukee Township.	Bay County, Kawkawlin Township.	Spread from:	To:
St. Clair County, Marine City.	St. Clair County, Clay Township.	Canada, (Locality not given).	Crawford County, Grayling Village.
St. Clair County, Port Huron City.	Lake County, Ellsworth Township.	Illinois, Chicago.	Iron County, Bates Township.
St. Clair County, Port Huron City.	St. Clair County, Capac Village.	Illinois, Chicago.	Isabella County, Denver Township.
St. Clair County, St. Clair City.	Oakland County, Ortonville Village.	Illinois, Chicago.	Jackson County, Parma Township.
Van Buren County, Keeler Township.	Berrien County, Bainbridge Township.	Indiana, Elkhart.	Cass County, Porter Township.
Washtenaw County, Ann Arbor City.	Macomb County, New Baltimore Village.	Indiana, Elkhart.	Emmet County, Little Traverse Township.
Washtenaw County, Lodi Township.	Washtenaw County, Ann Arbor City.	Indiana, (Locality not given).	Newaygo County, Fremont Village.
Wayne County, Detroit City.	Jackson County, Jackson City.	Indiana, Michigan City.	Jackson County, Jackson City.
Wayne County, Detroit City.	Monroe County, Monroe City.	Iowa, (Locality not given).	Ottawa County, Holland City.
Wayne County, Sumpter Township.	Monroe County, Exeter Township.	New York, Buffalo.	Wexford County, Cadillac City.
Wexford County, Cherry Grove Township.	Wexford County, Clam Lake Township.	Ohio, Toledo.	Crawford County, Grayling Village.

TABLE 48.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Ohio, Toledo.	Lenawee County, Fairfield Township.	Ohio, Toledo.	Monroe County, Erie Township.
Ohio, Toledo.	Macomb County, Clinton Township.	Texas, (Locality not given).	Berrien County, Benton Harbor City.

## RESTRICTIVE AND PREVENTIVE MEASURES IN DIPHTHERIA.

By reference to Table 49, it may be seen that, of the total number of reports in which a definite statement was made relative to the restrictive and preventive measures of isolation and disinfection in households in which diphtheria occurred, in 1906, a very large portion of the reports showed that the above measures had been enforced. One result of these restrictive and preventive measures is shown in the table, viz., the large number of households in which the disease was restricted to the first case.

It is believed that a very much better showing could be made relative to the results of the restrictive measures in diphtheria, as shown in Tables 49 to 52, if, in every case, the isolation of the patient was continued, even after apparent complete recovery, until it was determined by repeated bacteriological tests, that the throat of such person was free from the diphtheria bacillus. This applies, with equal force, to those persons who have been thoroughly exposed to the disease.

In the pamphlet on the "Restriction and Prevention of Diphtheria," published by this Department, the statement is made that, inasmuch as the duration of infectiousness in diphtheria has been proved to be at least three weeks, three weeks should be the shortest period of isolation after apparent complete recovery, unless bacteriological tests indicate the absence of the Löffler Bacillus.

The great difficulty in the way of determining when isolation in diphtheria outbreaks may be discontinued with safety is the absence, except in the case of three or four of the large cities, of facilities for making the necessary bacteriological tests. For this reason, the health officer is often placed in a difficult position, particularly where recovery takes place in a few days, as may be gathered from the following letter from the health officer of Grant township, Keweenaw county:

"Dr. C. J. Woolway,  
Delaware Mine,  
Keweenaw County, Mich.

Delaware Mine, Sept. 20, 1906.

Frank W. Shumway, M. D., Secretary State Board of Health, Lansing, Mich.

Dear Doctor—I received today your postal asking me to send final reports in the cases of diphtheria occurring in the households of ..... and ..... You state that you sent me the blanks for same on Sept. 18. Now the last case in .....’s was reported on Sept. 3. Of course in the three cases I reported they were well inside of a week but I have no means of taking a culture to find out whether it is positive or negative, so I have waited for a few weeks before making my final report and even then I may be premature. I practiced for twenty-one years in the city of St. Paul before

coming here last February and in cases of diphtheria the quarantine was not removed until two successive cultures proved negative and I have known the sign to be on the house for from four to six weeks. How long do you require quarantine in cases that are well in a week when you have no means of knowing whether a culture is positive or negative? After the recovery of these cases I have kept them isolated for some two weeks and even then as I have said I may be premature in removing the quarantine. In the ..... case I disinfected the house on the 18th and removed the sign on the 18th, some four weeks after the case started, and today the mother is taken down with it. On the same day I disinfected the ..... house and removed the sign. They are apparently well, but how do I know for positive that their throats are free from the bacillus and that they should not be isolated for days or weeks yet? Has your Board any specified time for removal of quarantine after apparent recovery?

Respectfully yours,

(Signed) C. J. WOOLWAY."

Table 50 and accompanying diagram are here printed for the first time. They are somewhat similar in form to tables and accompanying diagrams in the annual reports of this Department ending with 1904, but the figures now relate to *households* instead of *outbreaks*. The showing made, in 1906, in those instances in which the restrictive and preventive measures of placarding, isolation and disinfection were enforced, is encouraging, particularly in the case of the average number of deaths per household.

TABLE 49.—*Restrictive and preventive measures in diphtheria, in Michigan, in 1906.*

	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced.....	2,249	85
Neglected.....	156	6
Not stated, or statements doubtful.....	237	9
Instances in which the disease was restricted to the first case in a household.....	2,120	80
Instances in which more than one case occurred in a household.....	522	20

TABLE 50.—*Showing the total numbers of households in which diphtheria was present during the year 1906; and the total and average numbers of cases and deaths in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 2,642.		Restrictive measures enforced in 2,249 households.		Restrictive measures neglected in 156 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals.....	3,648	453	3,005	319	263	51
Average numbers per household.....	1.38	.17	1.34	.14	1.69	.33

DIPHTHERIA RESTRICTED  
BY ISOLATION AND DISINFECTION.



[Plate 1260.]

By Table 51, it may be seen that, in 1906, the fatality from diphtheria in those households in which the antitoxin treatment was used was thirty-two per cent less than in those households where it was not used.

The decrease in the death rate from diphtheria since 1894, when the general use of antitoxin began, may be seen by reference to Table 43, on a preceding page. It will be noted that, in 1906, the death rate per

100 cases and the deaths per 100,000 of the population were smaller than at any time since the disease has been studied by this Department.

TABLE 51.—*The antitoxin treatment of persons sick from diphtheria, in Michigan, in 1906.*

	Number of households.	Number of cases.	Number of deaths.	Deaths per 100 cases.
All outbreaks of diphtheria.....	2,642	3,643	453	12.4
Outbreaks in which antitoxin was used*.....	1,577	2,040	199	9.8
Outbreaks in which antitoxin was not used.....	1,026	1,463	211	14.4

\*There were also 39 households, in which 43 deaths occurred, and in which 140 cases were treated with antitoxin, but as only a portion of the cases in these households were so treated, and there was nothing in the reports to show how many of the 43 fatal cases were included in the 140 cases treated, the 39 households, together with the 140 cases and 43 deaths, are not included in the table.

The immunizing property of antitoxin is strikingly shown by Table 52. It should be stated, however, that of those exposed persons who were treated with antitoxin and who subsequently developed diphtheria, many of them had the disease in a very mild form.

TABLE 52.—*The number and per cent of persons exposed to diphtheria, who were treated with antitoxin, and who were subsequently taken sick with the disease, in each of the years 1902-1906.*

Year.	Exposed persons treated with antitoxin.		
	Number.	Taken sick.	Per cent.
1902.....	495	16	3.23
1903.....	585	12	2.05
1904.....	612	24	3.92
1905.....	1,312	50	3.81
1906.....	2,190	61	2.79
Average.....	1,039	33	3.18

In 1906, in 440 households, the exposed persons not treated with antitoxin were isolated during the incubation period of diphtheria.

## WHOOPING-COUGH IN MICHIGAN IN 1906 AND PRECEDING YEARS.

During the year ending December 31, 1906, whooping-cough was reported present in 770 households, with a total of 1,364 cases, including 392 deaths. As the health officers of Bay City, Escanaba, Saginaw and Detroit reported only fatal cases of whooping-cough, it was impossible to determine the number of households infected in these localities or the number of cases which occurred in such households.

TABLE 53.—*The general prevalence of whooping-cough, in Michigan, during the twenty-one years, 1886-1906.*

Years.	Population. (Estimated for intercensal years.)	Reported cases.*	Reported deaths.	Deaths per 100 cases.†	Deaths per 100,000 of the population.
1886.....	1,933,735	2,642	62	2.3	3.2
1887.....	1,973,774	2,267	59	2.6	3.0
1888.....	2,013,812	2,502	49	2.0	2.4
1889.....	2,053,851	2,694	41	1.5	2.0
1890.....	2,093,889	983	20	2.0	1.0
1891.....	2,130,827	2,360	101	4.3	4.7
1892.....	2,167,765	3,188	77	2.4	3.6
1893.....	2,204,703	4,047	134	3.3	6.1
1894.....	2,241,641	4,555	123	2.7	5.5
1895.....	2,271,531	4,284	109	2.5	4.8
1896.....	2,301,421	5,466	91	1.7	4.0
1897.....	2,331,311	3,978	72	1.8	3.1
1898.....	2,361,201	5,300	267	5.0	11.3
1899.....	2,391,091	6,509	216	3.3	9.0
1900.....	2,420,982	3,397	177	5.2	7.3
1901.....	2,450,872	2,955	118	4.0	4.8
1902.....	2,475,499	3,534	222	6.3	8.9
1903.....	2,502,758	4,172	361	8.7	14.4
1904.....	2,530,016	1,779	141	7.9	5.6
1905.....	2,557,275	1,196	119	9.9	4.7
1906.....	2,584,533	1,364	392	28.7	15.2
Averages per year.....	2,285,357	3,294	141	4.3	6.1

\*From many localities, only the fatal cases were reported during many of the years.

†For the reason that, in many instances, only the fatal cases were reported, these fatality rates are probably inaccurate.

In 1906, compared with the preceding year, there was a slight increase in the number of reported cases of whooping-cough, and the death rate per 100,000 inhabitants was very much higher.

Compared with the average for the twenty years, 1886-1905, in 1906, the number of reported cases of whooping-cough was sixty per cent less, while the death rate per 100,000 inhabitants was greater than at any time since the year 1880, as may be seen by reference to Tables 53 and 54.

The fatality rate (deaths per 100 cases) for whooping-cough in 1906 was about seven times greater than the average for the twenty years preceding, and nearly three times greater than the fatality rate for any year shown in Table 53.

In studying the fatality rates for whooping-cough, particularly in recent years, the fact should be borne in mind that prior to 1898, not all the deaths were reported, and that while the deaths from whooping-cough are now fully reported, a large number of cases are not reported, making the fatality in recent years much too high.

Table 54 gives the death rates for whooping-cough, as compiled by the Secretary of State, prior to the commencement of the compilation of this disease by the State Health Department. Comparing the death rates prior to 1886 with those since that time, it will be seen that, as a rule, the former were much greater, probably due to the different methods in use in the two departments in the classification of deaths from whooping-cough when complicated with or followed by other diseases induced by it.

TABLE 54.—*The number of deaths from whooping-cough, in Michigan, per 100,000 persons living, in each of the seventeen years, 1869-1885. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	13.9	10.1	5.5	15.1	15.6	11.2	7.2	12.4	8.7	8.5	10.2
Years.....	1880.	1881.	1882.	1883.	1884.	1885.	Average. 1869-1885.				
Deaths.....	16.1	8.4	5.0	5.2	8.8	7.4	10.0				

#### GEOGRAPHICAL DISTRIBUTION OF WHOOPING-COUGH.

Table 55 indicates that in the nine years, 1898-1906, compared with the average death rate for the entire State for the same period (9.0 per 100,000), whooping-cough was much more prevalent than the average in the Upper Peninsula division, and slightly more prevalent than the average in the Northern, Northeastern, Northern Central, Bay and Eastern and Southeastern divisions.

The counties in which whooping-cough was unusually prevalent during the nine years, 1898-1906, placed in the order of greatest prevalence, are: Alger, Houghton, Iron, Dickinson, Arenac, Delta, Menominee, Cheboygan, Marquette, Bay, Alpena, Otsego, Baraga, Midland, Gladwin, Roscommon, Macomb, Montcalm, Ontonagon, Schoolcraft, Sanilac and Ogemaw.



TABLE 55.—The geographical distribution of whooping-cough, in Michigan, in the nine years 1898–1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	264,394	712	49.3	18.6
Alger county.....	6,098	8	2	32.8
Baraga county.....	5,057	1	.7	13.8
Chippewa county.....	21,286	112	2	9.4
Delta county.....	25,677	81	5	19.5
Dickinson county.....	17,978	21	4	22.2
Gogebic county.....	16,703	29	1	6.0
Houghton county.....	66,057	178	18	27.2
Iron county.....	8,746	16	2	22.9
Keweenaw county.....	3,845	3	.2	5.2
Luce county.....	3,340	4	.3	9.0
Mackinac county.....	7,769	6	.3	3.9
Marquette county.....	40,286	143	7	17.4
Menominee county.....	26,274	39	5	19.0
Ontonagon county.....	6,800	8	.8	11.8
Schoolcraft county.....	8,478	63	1	11.8
NORTHWESTERN DIVISION.	89,814	90	6.7	7.5
Benzie county.....	10,676	7	.7	6.6
Grand Traverse county.....	22,449	34	2	8.9
Leelanau county.....	10,849	4	1	9.2
Manistee county.....	27,541	34	2	7.3
Wexford county.....	18,299	11	1	5.5
NORTHERN DIVISION.	80,822	125	8.0	9.9
Antrim county.....	15,619	33	1	6.4
Charlevoix county.....	15,004	10	1	6.7
Cheboygan county.....	16,650	17	3	18.0
Crawford county.....	3,353	5	.3	8.9
Emmet county.....	16,379	32	1	6.1
Kalkaska county.....	7,198	10	.7	9.7
Otsego county.....	6,619	18	1	15.1
NORTHEASTERN DIVISION.	58,327	90	6.2	10.6
Alcona county.....	5,628	2	.1	1.8
Alpena county.....	19,540	22	3	15.4
Iosco county.....	10,162	11	1	9.8
Montmorency county.....	3,459	15	.2	5.8
Ogemaw county.....	8,097	35	.9	11.1
Oscoda county.....	1,764	2	0	.....
Presque Isle county.....	9,677	3	1	10.3
WESTERN DIVISION.	275,008	256	16.8	6.1
Kent county.....	136,108	145	7	5.1
Lake county.....	5,039	6	0	.....
Mason county.....	19,713	25	2	10.1
Muskegon county.....	36,624	19	2	5.5
Newaygo county.....	18,094	12	1	5.5
Oceana county.....	17,485	24	.8	4.6
Ottawa county.....	41,945	25	4	9.5
NORTHERN CENTRAL DIVISION.	105,859	221	9.7	9.2
Clare county.....	8,863	22	.8	9.0
Gladwin county.....	7,556	20	1	13.2
Isabella county.....	23,920	32	2	8.4
Mecosta county.....	20,681	34	2	9.7
Midland county.....	14,923	71	2	13.4
Missaukee county.....	9,821	11	.7	7.1
Osceola county.....	18,464	25	1	5.4
Rosecommon county.....	1,631	6	.2	12.3

\* This footnote is below Table 53, on a preceding page.

TABLE 55.—CONCLUDED.

Geographical division	Average.			
	Population.	Cases.*	Deaths.	Death rates.
<b>BAY AND EASTERN DIVISION.</b>	<b>346,658</b>	<b>380</b>	<b>34</b>	<b>9.8</b>
Arenac county.....	9,708	10	2	20.6
Bay county.....	63,987	63	10	15.6
Huron county.....	35,123	73	3	8.5
Lapeer county.....	27,499	42	2	7.3
Saginaw county.....	53,850	46	6	7.2
Sanilac county.....	35,038	63	4	11.4
St. Clair county.....	55,374	44	4	7.2
Tuscola county.....	36,079	39	3	8.3
<b>CENTRAL DIVISION.</b>	<b>316,220</b>	<b>616</b>	<b>21.7</b>	<b>6.9</b>
Barry county.....	22,471	89	2	8.9
Clinton county.....	25,306	32	1	3.9
Eaton county.....	31,449	164	2	6.4
Genesee county.....	42,306	28	3	7.1
Grafton county.....	30,946	24	2	6.7
Ingham county.....	42,505	49	2	4.7
Ionia county.....	35,117	87	2	5.7
Livingston county.....	19,138	51	7	3.7
Montcalm county.....	33,742	48	4	11.9
Shiawassee county.....	34,026	44	3	8.8
<b>SOUTHWESTERN DIVISION.</b>	<b>143,034</b>	<b>188</b>	<b>11</b>	<b>7.7</b>
Allegan county.....	39,032	39	2	5.1
Berrien county.....	49,599	69	5	10.1
Cass county.....	20,505	32	1	4.9
Van Buren county.....	33,898	48	3	8.9
<b>SOUTHERN CENTRAL DIVISION</b>	<b>322,749</b>	<b>454</b>	<b>20.7</b>	<b>6.4</b>
Branch county.....	26,484	35	2	7.6
Calhoun county.....	52,026	88	4	7.7
Hillsdale county.....	29,842	56	8	2.7
Jackson county.....	47,581	91	4	8.4
Kalamazoo county.....	47,085	65	4	8.4
Lenawee county.....	48,862	49	3	6.1
St. Joseph county.....	23,703	25	9	3.8
Washtenaw county.....	46,566	45	2	4.3
<b>SOUTHEASTERN DIVISION.</b>	<b>478,801</b>	<b>232</b>	<b>45</b>	<b>9.4</b>
Macomb county.....	33,110	43	4	12.1
Monroe county.....	33,157	55	3	9.0
Oakland county.....	45,236	31	2	4.4
Wayne county.....	367,298	93	36	9.8

\* This footnote is below Table 53, on a preceding page.

TABLE 56.—*The reported sources of contagium in whooping-cough, in Michigan, in 1906, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Source.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions.....	57	59.4
Traced to former cases in same locality.....	38	39.6
Contracted at school.....	1	1.0
Not stated, or statements doubtful.....	674	* 87.5

\* Per cent of all households in which whooping-cough occurred.

TABLE 57.—Localities from which and to which whooping-cough was spread during the year 1903.

Spread from:	To:	Spread from:	To:
Allegan County, Manlius Township.	Allegan County, Fillmore Township.	Kent County, Grand Rapids City.	Barry County, Woodland Township.
Barry County, Castleton Township.	Barry County, Woodland Township.	Kent County, Grand Rapids City.	Emmet County, Petoskey City.
Bay County, Bay City.	Saginaw County, Tittabawassee Township.	Kent County, Grand Rapids City.	Isabella County, Nottawa Township.
Berrien County, Benton Harbor City.	Berrien County, Benton Township.	Kent County, Plainfield Township.	Kent County, Cannon Township.
Branch County, Union City Village.	Calhoun County, Tekonsha Village.	Lapeer County, Dryden Village.	Lapeer County, Dryden Township.
Calhoun County, Battle Creek City.	Allegan County, Martin Township.	Lenawee County, Riga Township.	Lenawee County, Palmyra Township.
Clare County, Arthur Township.	Gladwin County, Gladwin City.	Macomb County, Warren Village.	Macomb County, Sterling Township.
Delta County, Escanaba City.	Delta County, Maple Ridge Township.	Marquette County, Marquette City.	Marquette County, Powell Township.
Dickinson County, Waucedah Township.	Dickinson County, Norway City.	Mecosta County, Big Rapids City.	Mecosta County, Colfax Township.
Grand Traverse County, Traverse City.	Leelanau County, Cleveland Township.	Mecosta County, Big Rapids City.	Oceana County, Otto Township.
Grand Traverse County, Traverse City.	Leelanau County, Glen Arbor Township.	Mecosta County, Big Rapids City.	Ottawa County, Grand Haven City.
Grafton County, Wheeler Township.	Grafton County, Lafayette Township.	Montcalm County, Greenville City.	Montcalm County, Home Township.
Hillsdale County, Hillsdale City.	Monroe County, Bedford Township.	Muskegon County, Dalton Township.	Muskegon County, Cedar Creek Township.
Ingham County, Lansing City.	Calhoun County, Burlington Township.	Oakland County, Pontiac City.	Oakland County, White Lake Township.
Ingham County, Meridian Township.	Eaton County, Olivet Village.	Ontonagon County, (Locality not given).	Houghton County, Duncan Township.
Jackson County, Jackson City.	Hillsdale County, Wright Township.	Ottawa County, Holland City.	Allegan County, Douglas Village.

TABLE 57.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Saginaw County, Saginaw City.	Gratiot County, Wheeler Township.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
Saginaw County, Swan Creek Township.	Saginaw County, St. Charles Village.	Canada, (Locality not given).	Marquette County, Powell Township.
Tuscola County, Vassar Township.	Lapeer County, Rich Township.	Indiana, Elkhart.	Cass County, Porter Township.
Van Buren County, Paw Paw Township.	Van Buren County, Paw Paw Village.	Pennsylvania, (Locality not given).	Oscola County, Tustin Village.

## REPORTED SOURCES OF CONTAGIUM IN WHOOPING-COUGH.

Of the total number of reports of whooping-cough in 1906, but thirteen per cent gave a definite source of contagium.

As shown in Table 56, in 1906, fifty-nine per cent of the outbreaks were due to infection from outside jurisdictions, and forty per cent to infection from former cases.

The places from which and to which whooping-cough was spread in 1906 are shown in Table 57.

## RESTRICTIVE AND PREVENTIVE MEASURES IN WHOOPING-COUGH.

Table 58 indicates that in but twenty-two per cent of the outbreaks of whooping-cough is there any attempt made to restrict the disease, and this condition will continue until the dangerous character of the disease is fully and universally recognized.

TABLE 58.—Restrictive and preventive measures in whooping-cough, in Michigan, in 1906.

Restrictive and preventive measures.	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced.....	171	22
Neglected.....	390	51
Not stated, or statements doubtful.....	209	27

## SCARLET FEVER IN MICHIGAN IN 1906 AND PRECEDING YEARS.

### GENERAL PREVALENCE.

During the year 1906, scarlet fever was reported in 2,065 households in the State, with an aggregate of 3,066 cases, including 225 deaths.

In 1906, compared with the preceding year, there were 780 cases and 100 deaths more.

TABLE 59.—*The prevalence of scarlet fever, in Michigan, during the twenty-three years, 1884-1906.*

Years.	Population. (Estimated for intercensal years.)	Reported cases.*	Reported deaths.	Deaths per 100 cases.	Deaths per 100,000 of the population.
1884.....	1,853,658	2,476	230	9.3	12.4
1885.....	1,893,697	2,750	187	6.8	9.9
1886.....	1,933,735	3,046	275	9.0	14.2
1887.....	1,973,774	3,400	314	9.2	15.9
1888.....	2,013,812	2,989	200	6.7	9.9
1889.....	2,053,851	3,535	166	4.7	8.1
1890.....	2,093,889	3,835	162	4.2	7.7
1891.....	2,130,827	6,212	236	4.6	13.4
1892.....	2,167,765	7,075	487	6.9	22.5
1893.....	2,204,703	6,065	415	6.8	18.8
1894.....	2,241,641	5,500	203	3.7	9.1
1895.....	2,271,531	3,908	125	3.2	5.5
1896.....	2,301,421	2,646	81	3.1	3.5
1897.....	2,331,311	2,482	115	4.6	4.9
1898.....	2,361,201	2,409	100	4.2	4.2
1899.....	2,391,091	4,345	171	3.9	7.2
1900.....	2,420,982	6,734	306	4.5	12.6
1901.....	2,450,872	7,726	298	3.9	12.2
1902.....	2,475,499	6,582	248	3.8	10.0
1903.....	2,502,758	5,353	212	4.0	8.5
1904.....	2,530,016	4,088	228	5.6	9.0
1905.....	2,557,275	2,286	125	5.5	4.9
1906.....	2,584,533	3,066	225	7.3	8.7
Averages per year.....	2,249,558	4,283	224	5.2	10.0

\* Only the fatal cases were reported from Laurium village, in recent years, so that the figures in this column do not accurately represent the numbers of cases which occurred.

In 1906, compared with the average for twenty-three years, shown in Table 59, the numbers of cases were considerably less, the number of deaths slightly more, the death rate per 100,000 of the population slightly less, and the fatality (deaths per 100 cases) slightly more.

A comparison of the death rates in Tables 59 and 60 shows that, from 1870 to 1883, inclusive, the death rates from scarlet fever were much higher than in any year since that time, the highest rates being in the years prior to the establishment of the State Board of Health.

TABLE 60.—*The number of deaths from scarlet fever, in Michigan, per 100,000 persons living in each of the fifteen years, 1869–1883. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872!	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	22.1	72.0	56.6	44.3	43.9	32.2	30.0	27.4	26.9	27.7	26.3
Years.....	1880.	1881.	1882.	1883.	Average, 1869–1883.						
Deaths.....	22.7	22.8	34.3	37.9	35.1						

#### GEOGRAPHICAL DISTRIBUTION OF SCARLET FEVER.

Table 61 indicates that, compared with the average for the entire State for the fifteen years, 1892-1906 (9.3 deaths per 100,000 inhabitants), scarlet fever was much more prevalent than the average, in the Upper Peninsular, Southeastern, Northeastern and Northern divisions.

The counties in which scarlet fever was unusually prevalent in the fifteen years, 1892-1906, placed in the order of greatest death rates, are:

Houghton.....	with a death rate of 33.0 per 100,000
Oscoda .....	“ “ “ “ 27.8 “ “
Keweenaw .....	“ “ “ “ 26.5 “ “
Mackinac .....	“ “ “ “ 26.3 “ “
Gogebic .....	“ “ “ “ 25.1 “ “
Missaukee .....	“ “ “ “ 22.8 “ “
Lake .....	“ “ “ “ 18.5 “ “
Otsego .....	“ “ “ “ 16.9 “ “
Wayne .....	“ “ “ “ 16.5 “ “
Montmorency .....	“ “ “ “ 16.2 “ “
Crawford .....	“ “ “ “ 16.0 “ “
Alpena .....	“ “ “ “ 15.8 “ “
Chippewa .....	“ “ “ “ 15.8 “ “
Macomb .....	“ “ “ “ 15.2 “ “
Marquette .....	“ “ “ “ 15.1 “ “
Antrim .....	“ “ “ “ 13.8 “ “
Ontonagon .....	“ “ “ “ 13.8 “ “
Cheboygan .....	“ “ “ “ 12.8 “ “
Schoolcraft .....	“ “ “ “ 12.5 “ “
Gladwin .....	“ “ “ “ 12.2 “ “
Wexford .....	“ “ “ “ 12.0 “ “
Dickinson .....	“ “ “ “ 11.8 “ “

TABLE 61.—The geographical distribution of scarlet fever, in Michigan, in the fifteen years 1892-1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	243,504	599	43.5	17.9
Alger county.....	4,850	6	.1	2.1
Baraga county.....	4,763	3	0	.....
Chippewa county.....	19,046	37	3	15.8
Delta county.....	23,290	39	2	8.6
Dickinson county.....	16,891	31	2	11.8
Gogebie county.....	15,913	42	4	25.1
Houghton county.....	57,621	191	19	33.0
Iron county.....	7,559	8	.4	5.3
Keweenaw county.....	3,398	6	.9	26.5
Luce county.....	2,974	1	.2	6.7
Mackinac county.....	7,612	16	2	26.3
Marquette county.....	39,749	161	6	15.1
Menominee county.....	25,293	30	2	7.9
Ontonagon county.....	6,540	12	.9	13.8
Schoolcraft county.....	8,025	16	1	12.5
NORTHWESTERN DIVISION.	84,521	185	7.3	8.6
Benzie county.....	9,702	35	1	10.3
Grand Traverse county.....	20,610	52	2	9.7
Leelanau county.....	10,347	8	.3	2.9
Manistee county.....	27,158	51	2	7.4
Wexford county.....	16,704	39	2	12.0
NORTHERN DIVISION.	73,404	167	8.0	10.9
Antrim county.....	14,445	31	2	13.8
Charlevoix county.....	13,496	33	.9	6.7
Cheboygan county.....	15,655	32	2	12.8
Crawford county.....	3,116	10	.5	16.0
Emmet county.....	14,150	29	.9	6.4
Kalkaska county.....	6,613	20	.7	10.6
Otsego county.....	5,929	12	1	16.9
NORTHEASTERN DIVISION.	55,867	106	6.6	11.8
Alcona county.....	5,575	11	.5	9.0
Alpena county.....	18,937	31	3	15.8
Iosco county.....	11,096	19	1	9.0
Montmorency county.....	3,086	12	.5	16.2
Ogemaw county.....	7,163	23	.6	8.4
Oscoda county.....	1,798	4	.5	27.8
Presque Isle county.....	8,212	6	.5	6.1
WESTERN DIVISION.	269,549	512	17.4	6.5
Kent county.....	131,128	294	9	6.9
Lake county.....	5,415	21	1	18.5
Mason county.....	19,315	25	2	10.4
Muskegon county.....	37,039	70	2	5.4
Newaygo county.....	18,561	20	.7	3.8
Oceana county.....	17,199	24	.7	4.1
Ottawa county.....	40,892	58	2	4.9
NORTHERN CENTRAL DIVISION.	101,443	170.3	6.97	6.9
Clare county.....	8,560	8	.8	9.3
Gladwin county.....	6,546	11	.8	12.2
Isabella county.....	23,060	41	.6	2.6
Mecosta county.....	20,794	35	1	4.8
Midland county.....	14,334	25	.7	4.9
Missaukee county.....	8,753	19	2	22.8
Osceola county.....	17,753	31	1	5.6
Roscommon county.....	1,643	.3	.07	4.3

\*This footnote is below Table 59 on a preceding page.

TABLE 61.—CONCLUDED.

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	342,773	587	25.7	7.5
Arenac county.....	8,660	14	.7	8.1
Bay county.....	63,278	118	5	7.9
Huron county.....	34,151	40	3	8.5
Lapeer county.....	28,026	61	2	7.1
Saginaw county.....	83,350	107	5	6.0
Sanilac county.....	34,706	38	2	5.5
St. Clair county.....	55,068	141	5	9.1
Tuscola county.....	35,534	68	3	8.4
CENTRAL DIVISION.	315,546	624	15.5	4.9
Barry county.....	22,940	28	.9	3.9
Clinton county.....	25,699	58	2	7.8
Easton county.....	31,937	60	1	3.1
Genesee county.....	41,659	115	2	4.8
Gratiot county.....	29,629	39	1	3.4
Ingham county.....	41,466	77	2	4.8
Ionia county.....	35,017	84	2	5.7
Livingston county.....	19,632	35	.6	3.1
Montcalm county.....	33,927	64	2	5.9
Shiawassee county.....	33,640	64	2	5.9
SOUTHWESTERN DIVISION.	140,790	240	8.9	6.3
Allegan county.....	39,114	62	2	5.1
Berrien county.....	48,146	77	3	6.2
Cass county.....	20,763	34	.9	4.3
Van Buren county.....	32,767	67	3	9.2
SOUTHERN CENTRAL DIVISION.	317,781	624	14.9	4.7
Branch county.....	26,348	40	1	3.8
Calhoun county.....	50,338	70	1	2.0
Hillsdale county.....	29,980	51	1	3.3
Jackson county.....	47,228	98	2	4.2
Kalamazoo county.....	45,546	128	3	6.6
Lenawee county.....	48,737	107	3	6.2
St. Joseph county.....	24,235	50	.9	3.7
Washtenaw county.....	45,369	80	3	6.6
SOUTHEASTERN DIVISION.	449,392	872	64	14.2
Macomb county.....	32,833	77	5	15.2
Monroe county.....	35,164	46	1	3.0
Oakland county.....	44,232	68	2	4.5
Wayne county.....	339,163	681	56	16.5

\* This footnote is below Table 59, on a preceding page.

#### SCARLET FEVER IN URBAN AND RURAL LOCALITIES.

With the exception of group one, in which the city of Detroit, with a very high death rate from scarlet fever, is included, the death rates from scarlet fever in the groups of localities shown in Table 62 were considerably below the corresponding rate for the entire State in 1906.

The death rate from scarlet fever in the rural localities was greater than the death rate in any of the groups of cities and villages of 50,000 inhabitants and less.

The localities in certain of the groups in Table 62 in which the death rates from scarlet fever were unusually high in 1906, are as follows:



Group 1.—Detroit city .....	with a death rate of 31.1 per 100,000
Group 3.—Calumet township .....	“ “ “ “ “ 28.0 “ “
Group 4.—Laurium village.....	“ “ “ “ “ 57.8 “ “
Group 5.—Bessemer city .....	“ “ “ “ “ 64.3 “ “
Red Jacket village.....	“ “ “ “ “ 132.1 “ “
Coopersville village .....	“ “ “ “ “ 250.0 “ “
Group 6 (Rural localities).—	
Osceola Twp., Houghton Co.....	“ “ “ “ “ 94.0 “ “
Republic Twp., Marquette Co....	“ “ “ “ “ 190.0 “ “
Bloomfield Twp., Missaukee Co...	“ “ “ “ “ 738.9 “ “
Greenland Twp., Ontonagon Co...	“ “ “ “ “ 498.6 “ “

There were also a number of localities in group 6 in each of which one or two deaths occurred in 1906, and, in consideration of the small population of these localities, even these small numbers of deaths made the death rates of such localities very much higher than the average for the entire State for that year.

TABLE 62.—*The prevalence of scarlet fever in urban and rural localities, in Michigan, in 1906.*

Localities—grouped according to density of population.	Estimated population.	Health jurisdictions.			Cases.*	Deaths.	Death rates per 100,000 of the population.
		Infected.		Per cent of all jurisdictions.			
		Total.	Number.				
Cities over 50,000.....	440,984	2	2	100	377	116	26.3
Cities from 25,000 to 50,000..	147,162	4	4	100	98	6	4.1
Cities from 10,000 to 25,000 and Calumet township (17,885).....	261,286	18	14	78	389	12	4.6
Cities and villages from 5,000 to 10,000†.....	153,187	24	16	67	110	7	4.6
Cities and villages under 5,000†.....	369,743	337	86	26	391	17	4.6
Total urban..	1,372,362	385	122	32	1,865	158	11.5
Balance of localities—principally townships‡....	1,212,171	1,254	307	24	1,201	67	5.5

\* This footnote is below Table 59, on a preceding page.

† Exclusive of thirty-two villages in the two groups, for which the population in 1906 cannot be correctly estimated.

‡ Includes the 32 villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

#### THE SEASONAL PREVALENCE OF SCARLET FEVER.

For the reasons given in the preceding article on “Diphtheria in Michigan in 1906 and preceding years,” relative to the discontinuance of the study of the seasonal prevalence of that disease, the further study of the seasonal prevalence of scarlet fever is also discontinued. Table 61, on page 132 of the annual report of this Department for 1906, is the latest word by this Department upon the subject.

## THE REPORTED SOURCES OF CONTAGIUM IN SCARLET FEVER.

Of the outbreaks in the 185 households where the source of infection was definitely traced, 51 per cent were traced to a former case and 45 per cent to infection from outside jurisdictions.

By a comparison of the figures in Table 63 with the total number of households infected with scarlet fever in 1906, it will be seen that in but nine per cent of the households was the source of contagium traced by the health officer.

The places from which and to which scarlet fever was spread in 1906 are shown in Table 64.

The following brief statement relative to the sources of infection in some outbreaks of scarlet fever in 1906 will be of interest and may be of service to those engaged in the work of restricting and preventing the dangerous diseases:

*Scarlet fever spread from mild and neglected cases.*

A severe outbreak of scarlet fever occurred in AuTrain township, Alger county, nineteen cases having occurred in six households. The health officer did practically nothing for the restriction of the disease until requested to do so by this Department, and gave as a reason for his neglect that he had consulted a physician about the cases and that the latter had said that, owing to the mildness of the cases, there was no cause for apprehension.

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Fifteen cases of scarlet fever (one of which terminated fatally), in nine households, in Allegan village, were evidently due to a mild and neglected case, the history of which is contained in the following extract from a letter from the health officer of the village:

"The physician in charge of the case at the time of the alleged scarlet fever saw the child only once, at the beginning, and was not called again, the family apparently considering the ailment trivial, it not resembling scarlet fever when seen by the doctor. The doctor says he does not think it was scarlet fever. It was never reported to me, as scarlet fever or anything else, and I had no knowledge of it, official or otherwise. In a conversation with the child's mother the other day, she says she does not believe it was scarlet fever, as some of the cardinal symptoms were lacking, no eruption, no desquamation, etc. On the other hand, the physician who attended the child toward the last (having superseded the first mentioned doctor), declares that he found albumin and casts in the urine, and that in his opinion there was an antecedent scarlet fever followed by nephritis with uræmia subsequently developing and causing death. The scarlet fever, if it occurred, was very mild apparently in type, and occurred several months before the development of the uræmic symptoms. Of course no placarding or fumigating was done, and no isolation was practiced, as the case was not reported to me, and I had no knowledge of it, official or otherwise."

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Fifty-four cases of scarlet fever, in thirty-eight households, in Elk Rapids village were reported by the health officer to be due to several cases in the adjoining township of Milton which were not attended by

any physician or quarantined, and no steps were taken to prevent the spread of the disease in and from the township.

*Disinfection too soon or imperfect.*

Four cases of scarlet fever, in two households, in Forest Home township, Antrim county, were said to be due to infection from two children, recently recovered from scarlet fever, with whom the four other children had associated, at school and elsewhere, soon after their liberation from quarantine. The health officer was of the opinion that the disinfection, which was carried out by the attending physician, was done too soon. It may not have been thoroughly done.

*Scarlet fever probably spread by milk from infected house.*

Twenty-two cases of scarlet fever occurred, in eight households, in Blendon township, Ottawa county, and, according to the statement of one of the attending physicians, no attempt was made to restrict the disease to the first cases. The health officer himself, and three other members of his family were afflicted, and in one household, where four cases occurred, the head of the household was permitted to handle and deliver milk to the creamery during a portion of the time he was mingling with the infected family. To what extent the disease was spread through the agency of the milk will never be known, but there is a strong probability that the effects of such a blunder on the part of the health officer were far reaching.

*Infection from cases of scarlet fever several years previously.*

Four, and possibly eight, cases of scarlet fever, in three households, in Echo township, Antrim county, were reported as due to infection from cases of the disease in the same house several years previously. Many similar instances of the astonishing vitality of the scarlet fever germ may be found in the annual reports of this Department for the years 1889-91, 1894, 1896-1906.

TABLE 63.—*The reported sources of contagium in scarlet fever, in Michigan, in 1906, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of instances in which a source was given.
Traced to former cases in same jurisdiction.....	95	51.3
Outside jurisdictions.....	84	45.4
Infected premises, clothing, etc.....	4	2.2
At school.....	2	1.1
Not stated, or statements doubtful.....	1,889	*91.0

\* Per cent of all households in which scarlet fever occurred.

TABLE 64.—Localities from which and to which scarlet fever was spread during the year 1906.

Spread from:	To:	Spread from:	To:
Allegan County, Clyde Township.	Allegan County, Ganges Township.	Gratiot County, North Star Township.	Gratiot County, Emerson Township.
Antrim County, Elk Rapids Village.	Grand Traverse County, White Water Township.	Houghton County, Calumet Township.	Ontonagon County, Greenland Township.
Antrim County, Forest Home Township.	Antrim County, Helena Township.	Houghton County, Calumet Township.	Ontonagon County, Rockland Township.
Barry County, Hastings City.	Kent County, Lowell Village.	Ingham County, Bunkerhill Township.	Jackson County, Rives Township.
Barry County, Maple Grove Township.	Barry County, Nashville Village.	Iosco County, Baldwin Township.	Shiawassee County, Middlebury Township.
Bay County, Bay City.	Jackson County, Jackson City.	Iron County, Bates Township.	Iron County, Iron River Village.
Branch County, Sherwood Village.	Branch County, Union Township.	Iron County, Iron River Village.	Iron County, Stambaugh Township.
Calhoun County, Battle Creek City.	Calhoun County, Pennfield Township.	Jackson County, Jackson City.	Calhoun County, LeRoy Township.
Charlevoix County, Boyne City Village.	Charlevoix County, Chandler Township.	Jackson County, Sandstone Township.	Jackson County, Tompkins Township.
Cheboygan County, Cheboygan City.	Presque Isle County, Millersburg Village.	Kalamazoo County, Kalamazoo City.	St. Joseph County, Constantine Village.
Chippewa County, Sault Ste. Marie City.	Chippewa County, Bruce Township.	Kent County, Grand Rapids City.	Antrim County, Star Township.
Chippewa County, Sault Ste. Marie City.	Chippewa County, Whitefish Township.	Kent County, Grand Rapids City.	Barry County, Carlton Township.
Emmet County, (Locality not given).	Leelanau County, Glen Arbor Township.	Kent County, Grand Rapids City.	Jackson County, Waterloo Township.
Gogebic County, Wakefield Township.	Gogebic County, Bessemer City.	Kent County, Grand Rapids City.	Kent County, Plainfield Township.
Grand Traverse County, Traverse City.	Benzie County, Homestead Township.	Kent County, Grand Rapids City.	Kent County, Walker Township.
Gratiot County, Alma City.	Isabella County, Lincoln Township.	Kent County, Grand Rapids City.	Ottawa County, Zeeland Village.

TABLE 64.—CONTINUED.

Spread from:	To:	Spread from:	To:
Leelanau County, Elmwood Township.	Leelanau County, Kasson Township.	Washtenaw County, Ann Arbor City.	Clare County, Redding Township.
Mason County, Ludington City.	Mason County, Amber Township.	Washtenaw County, Ann Arbor City.	Washtenaw County, Scio Township.
Mecosta County, Big Rapids City.	Oakland County, Springfield Township.	Washtenaw County, Ann Arbor Township.	Washtenaw County, Superior Township.
Missaukee County, Norwich Township.	Wexford County, Manton Village.	Washtenaw County, Dexter Village.	Washtenaw County, Ann Arbor City.
Montcalm County, (Locality not given).	Ionia County, Belding City.	Washtenaw County, Manchester Village.	Washtenaw County, Sylvan Township.
Montcalm County, Sheridan Village.	Montcalm County, Greenville City.	Wayne County, Detroit City.	Oakland County, Farmington Township.
Oakland County, Holly Village.	Oakland County, Milford Township.	Wayne County, Detroit City.	Tuscola County, Fremont Township.
Oakland County, Rose Township.	Oakland County, Holly Village.	Wayne County, Detroit City.	Washtenaw County, Superior Township.
Ottawa County, Grand Haven City.	Ottawa County, Zeeland Village.	Wayne County, Detroit City.	Wayne County, Woodmere Village.
St. Clair County, Port Huron City	Huron County, Bad Axe City.	Wexford County, Cadillac City.	Missaukee County, Lake City Village.
St. Joseph County, Constantine Village.	St. Joseph County, Lockport Township.	FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.	
St. Joseph County, Fabius Township.	St. Joseph County, Flowerfield Township.	Spread from:	To:
Sanilac County, Lexington Township.	Sanilac County, Watertown Township.	Illinois, Chicago.	Berrien County, Benton Harbor City.
Schoolcraft County, (Locality not given).	Allegan County, Wayland Township.	Illinois, Chicago.	Berrien County, Sodus Township.
Van Buren County, Bangor Village.	Berrien County, Watervliet Village.	Illinois, Chicago.	Cass County, Dowagiac City.
Van Buren County, Bangor Village.	Van Buren County, Arlington Township.	Illinois, Chicago.	Saginaw County, St. Charles Township.

TABLE 64.—CONCLUDED.

Sp. read from:	To:	Spread from:	To:
Indiana, Hammond.	Montealm County, Eureka Township.	Indiana, (Locality not given).	St. Joseph County, Sherman Township.
Indiana, (Locality not given).	Berrien County, Weesaw Township.	Indiana, South Bend.	Manistee County, Filer Township.
Indiana, (Locality not given).	Kent County, Walker Township.	Wisconsin, Racine.	Midland County, Homer Township.

## RESTRICTIVE AND PREVENTIVE MEASURES IN SCARLET FEVER.

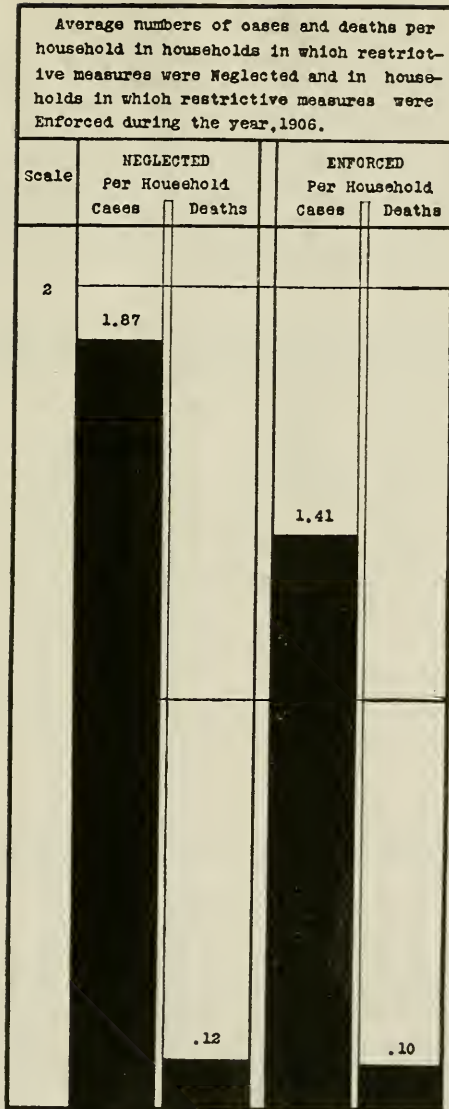
Positive statements relative to the measures taken for the restriction and prevention of scarlet fever in 1906 were made in eighty-seven per cent of the reports from health officers, and of this number, as may be seen by reference to Table 65, the restrictive and preventive measures were stated to have been enforced in seventy-seven per cent, and neglected in ten per cent, of the households. If this ratio held good for all the households in which scarlet fever occurred, it would indicate neglect in about twelve per cent of all households, but there is a strong probability that, in the thirteen per cent of the households relative to which no statement was made, the restrictive measures were not enforced, indicating considerable neglect.

By a comparison of Table 65 with the corresponding Table 64 on page 137 of the annual report of this Department for 1906, it will be seen that, under the old plan of reporting and compiling by *outbreaks*, the percentage of instances in which the restrictive measures were enforced was but little more than one-third of that under the new method of compiling by *households*. This is taken as a striking example of one of the imperfections of the old plan of reporting and not as an indication that a radical improvement has taken place in the matter of restricting the disease.

TABLE 65.—Restrictive and preventive measures in scarlet fever, in Michigan, in 1906.

Restrictive and preventive measures.	Number of households.	Per cent.
PLACARDING, ISOLATION AND DISINFECTION:		
Enforced.....	1,583	77
Neglected.....	222	10
Not stated, or statements doubtful.....	260	13

SCARLET FEVER RESTRICTED  
BY ISOLATION AND DISINFECTION.



[Plate 1261.]

As stated on page 137 of the annual report of this Department for 1906, this Department has conducted an active campaign against scarlet fever for nearly thirty years, and the results, at least in recent years, should be marked by a decreased prevalence of the disease in each year. That this is not so, is believed to be due to the fact that very many new health officers have to be educated each year in the methods of

restricting the disease, and to the further fact that very many of the health officers do not receive ample compensation for their labors, but are often denied the support and appreciation which their labors demand and are sometimes subjected to abuse. Under these conditions, it is not strange that many outbreaks of disease are not restricted to the first case in a household or to the first household in a locality.

Table 66, and accompanying diagram, are somewhat similar to tables and diagrams, showing the results of efforts for the restriction of scarlet fever, in the annual reports of this Department up to and including the year 1904. It is believed that a continuation of Table 66 for a number of years will show much better results than were shown by the tables in past years, when scarlet fever was studied by *outbreaks*.

TABLE 66.—*Showing the total number of households in which scarlet fever was present during the year 1906; and the total and average numbers of cases and deaths in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 2,065.		Restrictive measures enforced in 1,583 households.		Restrictive measures neglected in 222 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals.....	3,066	225	2,229	155	416	27
Average numbers per household.....	1.48	.11	1.41	.10	1.87	.12

## MEASLES IN MICHIGAN IN 1906 AND PRECEDING YEARS.

### GENERAL PREVALENCE.

During the year 1906, measles was reported present, in this State, in 4,091 households, with a total of 7,403 cases, including 188 deaths. As only fatal cases of measles were reported from Detroit city, it was impossible to determine the number of infected households in that city.

By reference to Table 67, it may be seen that in 1906, compared with the preceding year, there were 1,342 cases and 77 deaths less.

In 1906, compared with the average for the seventeen years, 1890-1906, there were 3,833 cases less and 54 deaths more, and the deaths per 100,000 inhabitants were 1.6 more.

A comparison of the death rates in Tables 66 and 67 indicates that, with the exception of the year 1900, as a rule, measles was much more prevalent in the years prior to the inauguration by this Department, in 1890, of active measures for its restriction, than in the years since that time.



TABLE 67.—*The prevalence of measles, in Michigan, during the seventeen years, 1890-1906.*

Years.	Population. (Estimated for intercensal years.)	Reported cases.*	Reported deaths.	Deaths per 100 cases.*	Deaths per 100,000 of the population.
1890.....	2,093,889	11,911	140	1.2	6.7
1891.....	2,130,827	12,173	149	1.2	7.0
1892.....	2,167,765	3,830	76	2.0	3.5
1893.....	2,204,703	7,334	119	1.6	5.4
1894.....	2,241,641	10,518	55	.5	2.5
1895.....	2,271,531	3,870	12	.3	.5
1896.....	2,301,421	15,409	156	1.0	6.8
1897.....	2,331,311	32,543	159	.5	6.8
1898.....	2,361,201	11,614	124	1.1	5.3
1899.....	2,391,091	12,005	166	1.4	6.9
1900.....	2,420,982	20,403	282	1.4	11.6
1901.....	2,450,872	4,629	62	1.3	2.5
1902.....	2,475,499	11,978	162	1.4	6.5
1903.....	2,502,758	8,941	140	1.6	5.6
1904.....	2,530,016	10,386	176	1.7	7.0
1905.....	2,557,275	6,061	111	1.8	4.3
1906.....	2,584,533	7,403	188	2.5	7.3
Averages per year.....	2,353,960	11,236	134	1.2	5.7

\* Only the fatal cases were reported from Detroit, and probably many other localities, so that the figures in this column do not nearly represent the number of cases which occurred.

TABLE 68.—*The number of deaths from measles, in Michigan, per 100,000 persons living, in each of the twenty-one years, 1869-1889. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.
Deaths.....	12.9	4.7	5.5	14.1	18.6	3.4	9.5	8.1	4.1	1.0	10.5
Years.....	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	Av. 1869- 1889.
Deaths.....	7.6	15.2	8.7	14.5	7.9	2.0	6.8	14.6	20.6	5.1	9.3

## GEOGRAPHICAL DISTRIBUTION OF MEASLES.

Table 69 shows that, as indicated by the average death rate for the entire State for the fourteen years, 1893-1906 (5.7 per 100,000), measles was much more prevalent than usual in the Upper Peninsular, Northern, and Northern Central divisions, and quite evenly distributed throughout the other divisions. It was least prevalent in the Central division.

The counties in which measles was unusually prevalent in the fourteen years, 1893-1906, placed in the order of greatest death rates, are as follows:

Baraga .....	death rate	18.5	per	100,000
Alger .....	" "	17.7	" "	" "
Alcona .....	" "	14.4	" "	" "
Bay .....	" "	14.2	" "	" "
Antrim .....	" "	13.6	" "	" "
Luce .....	" "	13.4	" "	" "
Delta .....	" "	12.6	" "	" "
Montmorency .....	" "	12.6	" "	" "
Dickinson .....	" "	11.8	" "	" "
Oceana .....	" "	11.6	" "	" "
Oscoda .....	" "	11.3	" "	" "
Missaukee .....	" "	11.2	" "	" "
Kalkaska .....	" "	10.5	" "	" "
Marquette .....	" "	10.1	" "	" "
Mecosta .....	" "	9.6	" "	" "
Isabella .....	" "	8.6	" "	" "
Benzie .....	" "	8.0	" "	" "
Branch .....	" "	7.6	" "	" "
Manistee .....	" "	7.4	" "	" "

TABLE 69.—The geographical distribution of measles, in Michigan, in the fourteen years 1893-1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
UPPER PENINSULAR DIVISION.	246,049	1,413	19.67	8.0
Alger county.....	5,078	31	.9	17.7
Baraga county.....	4,869	7	.9	18.5
Chippewa county.....	19,451	57	1	5.1
Delta county.....	23,737	77	3	12.6
Dickinson county.....	16,893	53	2	11.8
Gogebic county.....	15,921	102	1	6.3
Houghton county.....	59,024	401	4	6.8
Iron county.....	7,166	44	.5	7.0
Keeweenaw county.....	3,453	25	.2	5.8
Luce county.....	2,976	18	.4	13.4
Mackinac county.....	7,526	49	.07	.9
Marquette county.....	39,679	389	4	10.1
Menominee county.....	25,441	28	.9	3.5
Ontonagon county.....	6,722	47	.4	6.0
Schoolcraft county.....	8,113	85	.4	4.9
NORTHWESTERN DIVISION.	85,776	486	5.5	6.4
Benzie county.....	9,995	84	.8	8.0
Grand Traverse county.....	21,058	104	1	4.7
Leelanau county.....	10,495	48	.7	6.7
Manistee county.....	27,200	183	2	7.4
Wexford county.....	17,028	67	1	5.9
NORTHERN DIVISION.	74,506	447	5.7	7.7
Antrim county.....	14,659	113	2	13.6
Charlevoix county.....	13,703	91	.5	3.6
Cheboygan county.....	15,839	32	.9	5.7
Crawford county.....	3,101	20	.2	6.4
Emmet county.....	14,505	123	1	6.9
Kalkaska county.....	6,685	49	.7	10.5
Otsego county.....	6,014	19	.4	6.7
NORTHEASTERN DIVISION.	55,930	236	3.5	6.3
Alcona county.....	5,554	48	.8	14.4
Alpena county.....	19,080	52	.8	4.2
Iosco county.....	10,682	29	.4	3.7
Montmorency county.....	3,179	30	.4	12.6
Ogemaw county.....	7,224	41	.5	6.9
Oscoda county.....	1,770	2	.2	11.3
Presque Isle county.....	8,441	34	.4	4.7
WESTERN DIVISION.	270,324	1,993	14.1	5.2
Kent county.....	132,119	1,297	6	4.5
Lake county.....	5,291	34	.2	3.8
Mason county.....	19,434	69	1	5.1
Muskegon county.....	36,634	160	2	5.5
Newaygo county.....	18,342	74	.9	4.9
Oceana county.....	17,249	134	2	11.6
Ottawa county.....	41,255	225	2	4.8
NORTHERN CENTRAL DIVISION.	102,353	578	7.64	7.5
Clare county.....	8,584	68	.6	7.0
Gladwin county.....	6,669	17	.07	1.0
Isabella county.....	23,271	143	2	8.6
Mecosta county.....	20,790	140	2	9.6
Midland county.....	14,543	66	.9	6.2
Missaukee county.....	8,968	41	1	11.2
Oseola county.....	17,921	97	1	5.6
Roscommon county.....	1,607	6	.07	4.4

\* This footnote is below Table 67, on a preceding page.

TABLE 69.—CONCLUDED.

Geographical division.	Average.			
	Population.	Cases.*	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	343,396	1,133	19.0	5.5
Arenac county.....	8,833	19	.1	1.1
Bay county.....	63,465	249	9	14.2
Huron county.....	34,430	54	.9	2.6
Lapeer county.....	27,955	149	1	3.6
Saginaw county.....	83,096	243	3	3.6
Sanilac county.....	34,768	141	2	5.8
St. Clair county.....	55,195	193	2	3.6
Tuscola county.....	35,654	85	1	2.8
CENTRAL DIVISION.	316,134	1,688	12.6	4.0
Barry county.....	22,902	175	.9	3.9
Clinton county.....	25,664	135	.9	3.5
Eaton county.....	31,913	268	1	3.1
Genesee county.....	41,815	176	1	2.4
Grafton county.....	29,602	157	2	6.8
Ingham county.....	41,680	165	2	4.8
Ionia county.....	35,191	174	1	2.8
Livingston county.....	19,565	112	.8	4.1
Montcalm county.....	34,026	117	2	5.9
Shiawassee county.....	33,776	209	1	3.0
SOUTHWESTERN DIVISION.	141,375	861	8	5.6
Allegan county.....	39,108	249	2	5.1
Berrien county.....	48,572	284	3	6.2
Cass county.....	20,765	104	1	4.8
Van Buren county.....	32,930	224	2	6.1
SOUTHERN CENTRAL DIVISION.	318,903	2,062	13	4.1
Branch county.....	26,333	213	2	7.6
Calhoun county.....	50,754	307	1	2.0
Hillsdale county.....	29,961	202	2	6.7
Jackson county.....	47,342	217	1	2.1
Kalamazoo county.....	45,923	412	3	6.5
Lenawee county.....	48,756	333	1	2.1
St. Joseph county.....	24,245	160	1	4.1
Washtenaw county.....	45,589	218	2	4.4
SOUTHEASTERN DIVISION	454,322	677	30	6.6
Macomb county.....	32,903	81	2	6.1
Monroe county.....	33,241	116	2	6.0
Oakland county.....	44,449	226	2	4.5
Wayne county.....	343,729	254	24	7.0

\* This footnote is below Table 67, on a preceding page.

#### REPORTED SOURCES OF CONTAGIUM IN MEASLES.

Of the outbreaks in 4,091 households in which measles occurred in 1906, the source of infection was traced in but 524 instances, or less than thirteen per cent of the whole number of outbreaks, particulars relative to which may be found in Table 70.

The localities from which and to which measles was spread in 1906 are shown in Table 71.

TABLE 70.—*The reported sources of contagium in measles, in Michigan, in 1906, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions.....	335	64.0
Traced to former cases in same jurisdiction.....	188	35.8
Through the mail.....	1	.2
Not stated, or statements doubtful.....	3,567	* 87.2

\* Per cent of all households in which measles occurred.

TABLE 71.—Localities from which and to which measles was spread during the year 1906.

Spread from:	To:	Spread from:	To:
Allegan County, Otsego Township.	Allegan County, Watson Township.	Berrien County, Galien Village.	Berrien County, Weesaw Township.
Allegan County, Otsego Village.	Allegan County, Watson Township.	Berrien County, St. Joseph City.	Berrien County, Lake Township.
Alpena County, Alpena City.	Alpena County, Alpena Township.	Branch County, Butler Township.	Calhoun County, Clarendon Township.
Antrim County, Elk Rapids Village.	Grand Traverse County, Traverse City.	Branch County, Butler Township.	Calhoun County, Homer Township.
Barry County, Castleton Township.	Barry County, Maple Grove Township.	Branch County, Coldwater City.	Branch County, Coldwater Township.
Barry County, Hastings City.	Barry County, Carlton Township.	Branch County, Coldwater City.	Branch County, Girard Township.
Barry County, Hastings City.	Barry County, Thornapple Township.	Branch County, Coldwater City.	Branch County, Kinderhook Township.
Barry County, Hastings City.	Barry County, Woodland Township.	Branch County, Coldwater City.	Branch County, Ovid Township.
Barry County, Hastings City.	Barry County, Woodland Village.	Branch County, Coldwater City.	St. Joseph County, Burr Oak Village.
Barry County, Hastings City.	Ionia County, Campbell Township.	Branch County, Girard Township.	Branch County, Ovid Township.
Barry County, Hope Township.	Barry County, Barry Township.	Branch County, Girard Township.	Calhoun County, Tekonsha Village.
Barry County, Johnstown Township.	Barry County, Barry Township.	Branch County, Kinderhook Township.	Branch County, Ovid Township.
Barry County, Nashville Village.	Barry County, Maple Grove Township.	Branch County, Quincy Village.	Branch County, Coldwater City.
Bay County, Bay City.	Alcona County, Curtis Township.	Branch County, Quincy Village.	Hillsdale County, Allen Township.
Benzie County, Frankfort Village.	Calhoun County, Albion City.	Calhoun County, Battle Creek City.	Calhoun County, Leroy Township.
Berrien County, Benton Harbor City.	Berrien County, Watervliet Village.	Calhoun County, Battle Creek City.	Isabella County, Mt. Pleasant City.

TABLE 71.—CONTINUED.

Spread from:	To:	Spread from:	To:
Calhoun County, Clarendon Township.	Eaton County, Kalamo Township.	Emmet County, Bear Creek Township.	Emmet County, Harbor Springs Village.
Calhoun County, Homer Township.	Calhoun County, Clarendon Township.	Emmet County, Bear Creek Township.	Lenawee County, Adrian Township.
Calhoun County, Homer Township.	Calhoun County, Marengo Township.	Emmet County, McKinley Township.	Emmet County, Maple River Township.
Calhoun County, Homer Village.	Calhoun County, Albion Township.	Emmet County, Petoskey City.	Charlevoix County, Marion Township.
Calhoun County, Homer Village.	Calhoun County, Clarendon Township.	Genesee County, Flint City.	Genesee County, Richfield Township.
Calhoun County, Homer Village.	Calhoun County, Eckford Township.	Grand Traverse County, Fife Lake Village.	Grand Traverse County, Acme Township.
Calhoun County, Homer Village.	Jackson County, Jackson City.	Graiot County, Ithaca Village.	Graiot County, Lafayette Township.
Cheboygan County, Cheboygan City.	Chippewa County, Drummond Township.	Hillsdale County, Hillsdale City.	Hillsdale County, Jefferson Township.
Cheboygan County, Inverness Township.	Cheboygan County, Monroe Township.	Ingham County, Bunkerhill Township.	Ingham County, Leslie Township.
Chippewa County, Bruce Township.	Lapeer County, Almont Township.	Ingham County, Lansing City.	Barry County, Irving Township.
Chippewa County, Detour Village.	Chippewa County, Drummond Township.	Ingham County, Lansing City.	Calhoun County, Albion City.
Clinton County, Bath Township.	Clinton County, Dewitt Township.	Ingham County, Lansing City.	Clinton County, Bath Township.
Clinton County, Eagle Township.	Clinton County, Westphalia Township.	Ingham County, Lansing City.	Eaton County, Charlotte City.
Clinton County, St. Johns City.	Clinton County, Greenbush Township.	Ingham County, Lansing City.	Eaton County, Delta Township.
Delta County, Garden Village.	Sebeolcraft County, Manistique City.	Ingham County, Lansing City.	Hillsdale County, Somerset Township.
Emmet County, Alanson Village.	Emmet County, Maple River Township.	Ingham County, Lansing City.	Ingham County, Delhi Township.

TABLE 71.—CONTINUED.

Spread from:	To:	Spread from:	To:
Ingham County, Lansing City.	Ingham County, Meridian Township.	Ionia County, Ionia City.	Ionia County, Orange Township.
Ingham County, Lansing City.	Ingham County, Webberville Village.	Ionia County, Odessa Township.	Ionia County, Campbell Township.
Ingham County, Lansing City.	Ingham County, Wheatfield Township.	Ionia County, Portland Village.	Clinton County, Eagle Township.
Ingham County, Lansing City.	Ingham County, Williamston Township.	Ionia County, Portland Village.	Ionia County, Orange Township.
Ingham County, Lansing City.	Jackson County, Parma Township.	Iosco County, East Tawas City.	Iosco County, Sherman Township.
Ingham County, Lansing City.	Livingston County, Brighton Village.	Iosco County, East Tawas City.	Iosco County, Wilber Township.
Ingham County, Lansing City.	Livingston County, Deerfield Township.	Iosco County, East Tawas City.	Livingston County, Brighton Village.
Ingham County, Lansing City.	Shiawassee County, Woodhull Township.	Iosco County, Tawas City.	Iosco County, Sherman Township.
Ingham County, (Locality not given).	Livingston County, Conway Township.	Iosco County, Tawas Township.	Iosco County, Wilber Township.
Ionia County, Belding City.	Ionia County, Ronald Township.	Jackson County, Jackson City.	Allegan County, Martin Township.
Ionia County, Belding City.	Kent County, Cannon Township.	Jackson County, Jackson City.	Hillsdale County, Scipio Township.
Ionia County, Belding City.	Kent County, Grattan Township.	Jackson County, Jackson City.	Jackson County, Henrietta Township.
Ionia County, Belding City.	Kent County, Vergennes Township.	Jackson County, Jackson City.	Lenawee County, Clinton Village.
Ionia County, Danby Township.	Eaton County, Mulliken Village.	Jackson County, Liberty Township.	Jackson County, Hanover Township.
Ionia County, Hubbardston Township.	Clinton County, Lebanon Township.	Jackson County, Springport Village.	Calhoun County, Albion City.
Ionia County, Ionia City.	Calhoun County, Albion City.	Kalamazoo County, Galesburg Village.	Kalamazoo County, Pavilion Township.



TABLE 71.—CONTINUED.

Spread from :	To :	Spread from :	To :
Kalamazoo County, Kalamazoo City.	Allegan County, Allegan Village.	Kent County, Grand Rapids City.	Kent County, Plainfield Township.
Kalamazoo County, Kalamazoo City.	Barry County, Maple Grove Township.	Kent County, Grand Rapids City.	Kent County, Walker Township.
Kalamazoo County, Kalamazoo City.	Berrien County, Lincoln Township.	Kent County, Grand Rapids City.	Mecosta County, Morton Township.
Kalamazoo County, Kalamazoo City.	Eaton County, Olivet Village.	Kent County, Grand Rapids City.	Newaygo County, Denver Township.
Kalamazoo County, Kalamazoo City.	Kalamazoo County, Alamo Township.	Kent County, Nelson Township.	Kent County, Cedar Springs Village.
Kalamazoo County, Kalamazoo City.	Kalamazoo County, Cooper Township.	Kent County, Sand Lake Village.	Montcalm County, Pierson Village.
Kalamazoo County, Kalamazoo City.	Monroe County, Milan Township.	Lake County, (Locality not given).	Berrien County, Lake Township.
Kalamazoo County, Kalamazoo City.	St. Joseph County, Constantine Village.	Lapeer County, Almont Village.	Lapeer County, Almont Township.
Kalamazoo County, Kalamazoo City.	Van Buren County, Pine Grove Township.	Lapeer County, Almont Village.	St. Clair County, Berlin Township.
Kalkaska County, Kalkaska Township.	Kalkaska County, Excelsior Township.	Lapeer County, Clifford Village.	Lapeer County, Dryden Village.
Kalkaska County, Kalkaska Village.	Antrim County, Milton Township.	Lapeer County, Dryden Village.	Lapeer County, Almont Township.
Kalkaska County, (Locality not given).	Oceana County, Otto Township.	Lapeer County, Dryden Village.	Lapeer County, Dryden Township.
Kalkaska County, Rapid River Township.	Marquette County, Wells Township.	Lapeer County, Lapeer City.	Lapeer County, Mayfield Township.
Kent County, Cedar Springs Village.	Kent County, Algoma Township.	Leelanau County, Empire Township.	Leelanau County, Glen Arbor Township.
Kent County, Grand Rapids City.	Emmet County, Petoskey City.	Leelanau County, Empire Village.	Leelanau County, Empire Township.
Kent County, Grand Rapids City.	Kent County, Cannon Township.	Lenawee County, Riga Township.	Monroe County, Bedford Township.

TABLE 71.—CONTINUED.

Spread from:	To:	Spread from:	To:
Lenawee County, Woodstock Township.	Hillsdale County, Scipio Township.	Montcalm County, Lakeview Village.	Montcalm County, Cato Township.
Livingston County, Brighton Village.	Livingston County, Green Oak Township.	Montcalm County, (Locality not given).	Antrim County, Mancelona Village.
Macomb County, Armada Village.	Macomb County, Ray Township.	Montcalm County, (Locality not given).	Eaton County, Chester Township.
Manistee County, Arcadia Township.	Manistee County, Pleasanton Township.	Montcalm County, (Locality not given).	Kent County, Grattan Township.
Manistee County, Copemish Village.	Manistee County, Arcadia Township.	Montcalm County, Stanton City.	Isabella County, Mt. Pleasant City.
Marquette County, Negaunee City.	Marquette County, Ishpeming City.	Montcalm County, Stanton City.	Montcalm County, Evergreen Township.
Mecosta County, Big Rapids City.	Newaygo County, Barton Township.	Montmorency County, Hillman Village.	Alpena County, Long Rapids Township.
Mecosta County, Deerfield Township.	Mecosta County, Morley Village.	Montmorency County, Hillman Village.	Montmorency County, Avery Township.
Missaukee County, McBain Village.	Missaukee County, Riverside Township.	Montmorency County, Hillman Village.	Montmorency County, Hillman Township.
Monroe County, Erie Township.	Monroe County, Bedford Township.	Montmorency County, (Locality not given).	Otsego County, Charlton Township.
Montcalm County, Ferris Township.	Jackson County, Parma Township.	Muskegon County, Sullivan Township.	Ottawa County, Polkton Township.
Montcalm County, Greenville City.	Gratiot County, Perrinton Village.	Newaygo County, Grant Township.	Newaygo County, Ashland Township.
Montcalm County, Greenville City.	Kent County, Spencer Township.	Newaygo County, Newaygo Village.	Newaygo County, Ashland Township.
Montcalm County, Greenville City.	Montcalm County, Fairplain Township.	Newaygo County, White Cloud Village.	Newaygo County, Big Prairie Township.
Montcalm County, Lakeview Village.	Mecosta County, Deerfield Township.	Oakland County, Clarkston Village.	Oakland County, Waterford Township.
Montcalm County, Lakeview Village.	Midland County, Lincoln Township.	Oakland County, Pontiac City.	Oakland County, Farmington Village.

TABLE 71.—CONTINUED.

Spread from:	To:	Spread from:	To:
Osceola County, Evart Village.	Missaukee County, McBain Village.	Sanilac County, Wheatland Township.	Sanilac County, Marion Township.
Osceola County, Hersey Village.	Osceola County, Sylvan Township.	Schoolcraft County, Manistique City.	Benzie County, South Frankfort Village.
Osceola County, LeRoy Township.	Osceola County, Burdell Township.	Schoolcraft County, Manistique City.	Schoolcraft County, Manistique Township.
Osceola County, Reed City Village.	Lake County, Chase Township.	Van Buren County, Covert Township.	Berrien County, Coloma Village.
Osceola County, Reed City Village.	Osceola County, Lincoln Township.	Van Buren County, Lawrence Village.	Van Buren County, Arlington Township.
Osceola County, Tustin Village.	Missaukee County, McBain Village.	Van Buren County, Pine Grove Township.	Kalamazoo County, Alamo Township.
Ottawa County, Polkton Township.	Ottawa County, Wright Township.	Van Buren County, Waverly Township.	Van Buren County, Arlington Township.
Presque Isle County, Onaway City.	Cheboygan County, Tuscarora Township.	Washtenaw County, Milan Village.	Monroe County, Milan Township.
Presque Isle County, Onaway City.	Iosco County, East Tawas City.	Washtenaw County, Saline Village.	Washtenaw County, Milan Village.
Saginaw County, Brady Township.	Saginaw County, Chesaning Village.	Wayne County, Detroit City.	Calhoun County, Albion City.
Saginaw County, Saginaw City.	Gratiot County, Wheeler Township.	Wayne County, Detroit City.	Calhoun County, Emmet Township.
St. Clair County, Port Huron City.	Sanilac County, Sandusky City.	Wayne County, Detroit City.	Emmet County, Harbor Springs Village.
St. Joseph County, Nottawa Township.	St. Joseph County, Mendon Township.	Wayne County, Detroit City.	Lenawee County, Morenci Village.
Sanilac County, Elmer Township.	Sanilac County, Moore Township.	Wayne County, Detroit City.	Livingston County, Howell Village.
Sanilac County, Marlette Village.	Sanilac County, Moore Township.	Wayne County, Detroit City.	Oakland County, Waterford Township.
Sanilac County, Wheatland Township.	Sanilac County, Deckerville Village.	Wayne County, Detroit City.	Oakland County, West Bloomfield Township.

TABLE 71.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Wayne County, Detroit City.	Sanilac County, Lexington Village.	Illinois, Chicago.	Ottawa County, Olive Township.
Wexford County, Cadillac City.	Wexford County, Harring Township.	Illinois, Chicago.	Saginaw County, St. Charles Township.
FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.		Indiana, Elkhart.	St. Joseph County, Centerville Village.
Spread from:	To:	Indiana, (Locality not given).	Kent County, Sparta Township.
Canada, (Locality not given).	Washtenaw County, Ann Arbor City.	Indiana, Michigan City.	Berrien County, New Buffalo Village.
Canada, Toronto.	Ottawa County, Allendale Township.	Indiana, Michigan City.	Berrien County, Three Oaks Township.
Illinois, Chicago.	Berrien County, Benton Township.	Indiana, Michigan City.	Jackson County, Jackson City.
Illinois, Chicago.	Cass County, Wayne Township.	Ohio, (Locality not given).	Jackson County, Jackson City.
Illinois, Chicago.	Genesee County, Grand Blanc Township.	Ohio, Toledo.	Lenawee County, Ogden Township.
Illinois, Chicago.	Hillsdale County, Litchfield Township.	Ohio, Toledo.	Monroe County, Bedford Township.
Illinois, Chicago.	Kent County, Sparta Village.	Wisconsin, Milwaukee.	Ottawa County, Grand Haven Township.

## RESTRICTIVE AND PREVENTIVE MEASURES IN MEASLES.

Table 72 indicates that in but forty-six per cent of the households in which measles occurred in 1906, were the restrictive and preventive measures all enforced. This, however, is a much better showing than was made in preceding reports, when the disease was studied by *outbreaks*, as may be seen by reference to Table 71, on page 148 of the annual report of this Department for 1906, and is an indication of the more scientific method of studying the disease by *households*, and not an indication that measles is being restricted to a much greater extent than in the preceding years. The fact that, in 1906, sixty-four per cent of the outbreaks of measles were traced to infection from outside jurisdictions, is a very good indication that the disease is not being restricted to any considerable extent.

In the past, the question has frequently arisen as to the necessity

for placarding in outbreaks of measles, and many health officers have experienced considerable difficulty in the performance of their duty in this respect. The following letter and reply thereto are printed for the benefit of those who may be in doubt as to this question:

"Detour, June 15th, 1906.

"Sec. of the State Board of Health, Lansing, Mich.

"Dear Sir—There has been some dispute regarding the necessity of placarding houses for measles. Some say it is not necessary to do so, and that there is no State law that would enforce it. I would like to have your valued opinion on this, and if there is any State law covering this case, where could I find it? It has been my opinion that it was necessary and imperative to placard, but would like to know for sure. Hoping to hear from you at your convenience, I am

"Yours very truly,

"(Signed) F. E. CAMERON,

"Detour, Mich."

"STATE BOARD OF HEALTH.

MICHIGAN.

*Office of the Secretary, Lansing.*

June 18, 1906.

"Dr. F. E. Cameron, Detour, Mich.

"My Dear Doctor:—Yours of the 15th inst. regarding measles is before me and in reply will state that Sec. 4450 of the Compiled Laws of 1897 states that when any disease dangerous to the public health is found to exist the board of health shall use all possible care to prevent the spreading of the infection and to give public notice of infected places.

"Secs. 4460-4462 of the Compiled Laws of 1897 specifying some of the duties of the health officer, requires the health officer to give public notice of infected places by placard on the premises, and otherwise if necessary.

"Under separate cover, I am sending you a few copies of the revised pamphlet bearing upon the restriction of measles, in which you will find the recommendations of this Department and which are, in short, the isolation, of all persons having measles, the placarding of the infected premises and then after recovery a thorough disinfection of the premises. That is the least that can be done and comply with the law above mentioned.

"Very truly yours,

"(Signed) F. W. SHUMWAY,

"Secretary."

The apathy of the people in respect to the restriction and prevention of measles has done much to discourage those who would put forth their best energies in the work of restricting this often underestimated but really dangerous disease.

Parents are ignorant of or indifferent to the danger to be apprehended from the exposure of their children to measles, and, in many instances, do not secure the services of a physician for their children when suffering from this disease. Many parents are also ignorant of their duty, under the law, in respect to the reporting of cases of measles to the local health officials, and, as a consequence, the health officials are not in a position to institute restrictive measures or to make complete reports to this Department relative to the prevalence of measles in their locality. To the parents then we must look primarily for any considerable reduction in the sickness and mortality from measles, and for more complete reports of the disease. This means educational work on the part

of those who have charge of the health service of the State, both local and general, and the State Health Department stands ready at all times to assist the local health officials in this educational work, by means of advice, and by the furnishing of documents on the restriction and prevention of measles for distribution among the families and neighbors of those sick with the disease. A leaflet issued by the local board of health, setting forth the dangerous character of measles and the duty of householders in outbreaks of the disease, and widely distributed at a time when measles was present in any locality, would, it is believed, prove to be one of the best methods for securing the cooperation of the people in the restriction of the disease. And the educational work should be continued from time to time as measles may appear in the locality until the people are thoroughly awakened to the necessity for its restriction.

A suggested form of leaflet for this purpose, which, however, may be changed to suit the needs of the locality, was printed in the annual report for 1906, and is here reprinted for the benefit of those who may not be in possession of a copy of the preceding report.

## MEASLES IS PRESENT IN THIS LOCALITY.

### Measles is a Dangerous Disease, and Can and Should be Restricted and Prevented.

In Michigan, measles causes eleven times as many deaths as does smallpox, and yet the people become alarmed whenever smallpox appears in a locality, and immediately institute rigid measures for its restriction, even to the extent of placing guards outside the premises where it occurs to maintain the quarantine.

There are two erroneous and very harmful beliefs, quite prevalent among parents,—that measles cannot ultimately be escaped any more than teething, and that the least dangerous time for persons to have the disease is while quite young children. Statistics have proved that measles can be restricted and prevented, and that the disease is most fatal among the very young, sixty-four per cent of all the deaths from measles occurring in those under five years.

If then we safeguard our children, especially the very young, from the infection of measles, the probability of their dying from or even contracting the disease in advanced youth, or in the years of maturity or old age, will be very remote.

But the fatality from measles is not the only danger to be apprehended. Measles is frequently complicated with or followed by the two most dangerous diseases,—pneumonia and tuberculosis—and often leaves a weakness of the eyes, ears, bowels and the respiratory organs.

Upon the outbreak of measles in any household, it is the duty of the householder, and the attending physician, if any is called, to at once notify the local health officer of the same, and every person who has any regard for the welfare of the community should cheerfully comply with the law in this particular.

Measles may be spread by the sick before the eruption appears, and, for this reason, the parents of young children should be suspicious of a troublesome cough, or frequent sneezing, especially if accompanied by a fever, and should immediately separate the child so affected from the well persons, and keep him or her isolated until satisfied that the symptoms are not those of measles or of any other dangerous communicable disease.

Information relative to the proper methods of restricting and preventing measles may be obtained by application to the health officer of the locality.

By order of the Board of Health of the ..... of .....

\_\_\_\_\_  
President.

\_\_\_\_\_  
Secretary.

\_\_\_\_\_  
Date.

TABLE 72.—*Restrictive and preventive measures in measles, in Michigan, in 1906.*

Restrictive and preventive measures.	Number of households.	Per cent.
<b>PLACARDING, ISOLATION AND DISINFECTION:</b>		
Enforced.....	1,863	46
Neglected.....	979	24
Not stated, or statements doubtful.....	1,249	30

## SMALLPOX IN MICHIGAN IN 1906 AND PRECEDING YEARS.

### GENERAL PREVALENCE. .

During the year 1906, smallpox was reported present in 519 households in this State, with an aggregate of 1,240 cases, including 3 deaths.

By Table 73 it may be seen that, in 1906, compared with the number of cases and deaths from smallpox in the preceding year, there were 1,745 cases and 71 deaths less.

In 1906, compared with the average numbers of cases and deaths from smallpox for the five years, 1901-1905, there were 4,211 cases and 37 deaths less.

A comparison of smallpox in 1906 with the years prior to 1901 may be made by reference to Table 73, in which it will be seen that from 1882 to 1901 there was, comparatively, but little smallpox in the State. The fatality (deaths per 100 cases), however, was very much greater in the years in which deaths occurred prior to 1901.

Table 74 shows that the average number of deaths from smallpox, per 100,000 of the population, for the thirteen years prior to the institution, by this Department, of active measures for the restriction of this disease, was very much greater than the average for the twenty-five years since that time. Excluding the year 1882, in which the results of the educational work could scarcely be expected to show any marked results, the death rate for the twenty-four years, ending in 1906, was about seven-tenths of one per cent per 100,000.



TABLE 73.—*The prevalence of smallpox, in Michigan, during the twenty-five years, 1882-1906.*

Years.	Population. (Estimated for intercensal years.)	Reported cases.	Reported deaths.	Deaths per 100 cases	Deaths per 100,000 of the population.
1882.....	1,745,298	589	159	27.0	9.1
1883.....	1,799,478	29	2	6.9	.1
1884.....	1,853,658	22	3	13.6	.2
1885.....	1,893,697	27	6	22.2	.3
1886.....	1,933,735	24	7	29.2	.4
1887.....	1,973,774	4	0	0	0
1888.....	2,013,812	42	6	14.3	.3
1889.....	2,053,851	57	4	7.0	.2
1890.....	2,093,889	2	0	0	0
1891.....	2,130,827	3	0	0	0
1892.....	2,167,765	1	1	100.0	.05
1893.....	2,204,703	10	3	30.0	.1
1894.....	2,241,641	285	60	21.1	2.7
1895.....	2,271,581	187	47	25.1	2.1
1896.....	2,301,421	38	16	42.1	.7
1897.....	2,331,311	15	0	0	0
1898.....	2,361,201	32	1	3.1	.04
1899.....	2,391,091	139	6	4.3	.3
1900.....	2,420,982	694	9	1.3	.4
1901.....	2,450,872	5,088	31	.6	1.3
1902.....	2,475,499	7,086	40	.6	1.6
1903.....	2,502,758	6,341	33	.5	1.3
1904.....	2,530,016	5,753	24	.4	.9
1905.....	2,557,275	2,985	74	2.5	2.9
1906.....	2,584,533	1,240	3	.2	.1
Averages per year.....	2,211,385	1,228	21	1.7	1.0

TABLE 74.—*The number of deaths from smallpox, in Michigan, per 100,000 persons living in each of the thirteen years, 1869-1881. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Years.....	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.	Average, 1869-81.
Deaths.....	3.7	0.8	6.0	23.7	7.0	1.3	1.8	5.2	6.8	0.4	0.4	0.2	4.9	4.8

## GEOGRAPHICAL DISTRIBUTION OF SMALLPOX.

Table 75 indicates that, according to the average death rate from smallpox for the entire State (1.0 per 100,000 of the population), during the nine years, 1898-1906, smallpox was more prevalent than usual in the western, northeastern, northern and southern central divisions.

As indicated by the death rates, the counties in which smallpox was much more than usually prevalent, during the nine years, 1898-1906, placed in the order of greatest death rates, are:

Jackson .....	death rate 6.3 per 100,000
Kent .....	" " 3.7 " "
Delta .....	" " 3.1 " "
Presque Isle .....	" " 3.1 " "
Mackinac .....	" " 2.6 " "
Emmet .....	" " 2.4 " "
Arenac .....	" " 2.1 " "
Chippewa .....	" " 1.9 " "
Osceola .....	" " 1.6 " "
Alpena .....	" " 1.5 " "
Kalkaska .....	" " 1.4 " "
Antrim .....	" " 1.3 " "

TABLE 75.—*The geographical distribution of smallpox, in Michigan, in the nine years, 1898–1906, as indicated by the average numbers of cases and deaths, and the average deaths per 100,000 persons living, in each geographical division shown in the table.*

Geographical Division.	Average.			
	Population.	Cases.	Deaths.	Death rates.
<b>UPPER PENINSULAR DIVISION.</b>	264,394	275	2.4	.9
Alger county.....	6,098	8	0	.....
Baraga county.....	5,037	7	0	.....
Chippewa county.....	21,286	36	.4	1.9
Delta county.....	25,677	42	.8	3.1
Dickinson county.....	17,978	10	0	.....
Gogebic county.....	16,703	11	0	.....
Houghton county.....	66,057	38	.4	.6
Iron county.....	8,746	7	0	.....
Keweenaw county.....	3,845	1	0	.....
Luce county.....	3,340	4	0	.....
Mackinac county.....	7,769	25	.2	2.6
Marquette county.....	40,286	21	.4	1.0
Menominee county.....	26,274	50	.2	.8
Ontonagon county.....	6,800	2	0	.....
Schoolcraft county.....	8,478	13	0	.....
<b>NORTHWESTERN DIVISION.</b>	89,814	80	.3	.3
Benzie county.....	10,676	13	0	.....
Grand Traverse county.....	22,449	30	.2	.9
Leelanau county.....	10,849	4	0	.....
Manistee county.....	27,541	6	0	.....
Wexford county.....	18,299	27	.1	.5
<b>NORTHERN DIVISION.</b>	80,822	262	.9	1.1
Antrim county.....	15,619	42	.2	1.3
Charlevoix county.....	15,004	34	0	.....
Cheboygan county.....	16,650	81	.2	1.2
Crawford county.....	3,353	8	0	.....
Emmet county.....	16,379	38	.4	2.4
Kalkaska county.....	7,198	31	.1	1.4
Otsego county.....	6,619	28	0	.....
<b>NORTHEASTERN DIVISION.</b>	58,327	181	.8	1.4
Alcona county.....	5,028	21	0	.....
Alpena county.....	19,540	54	.3	1.5
Iosco county.....	10,162	35	.1	1.0
Montmorency county.....	3,439	12	0	.....
Ogemaw county.....	8,097	30	.1	1.2
Oscoda county.....	1,764	3	0	.....
Presque Isle county.....	9,677	26	.3	3.1
<b>WESTERN DIVISION.</b>	275,008	313	5.9	2.1
Kent county.....	136,108	143	5	3.7
Lake county.....	5,039	12	0	.....
Mason county.....	19,713	39	.2	1.0
Muskegon county.....	36,624	24	.2	.5
Newaygo county.....	18,094	16	.1	.6
Oceana county.....	17,485	31	0	.....
Ottawa county.....	41,945	48	.4	1.0
<b>NORTHERN CENTRAL DIVISION.</b>	105,859	379	.9	.9
Clare county.....	8,863	31	.1	1.1
Gladwin county.....	7,556	38	0	.....
Isabella county.....	23,920	104	.2	.8
Mecosta county.....	20,681	37	.2	1.0
Midland county.....	14,923	34	0	.....
Misaukee county.....	9,821	41	.1	1.0
Oseola county.....	18,464	70	.3	1.6
Rosecommon county.....	1,631	4	0	.....

TABLE 75.—CONCLUDED.

Geographical Division.	Average.			
	Population.	Cases.	Deaths.	Death rates.
BAY AND EASTERN DIVISION.	346,647	713	2.9	.8
Arenac county.....	9,708	31	.2	2.1
Bay county.....	63,987	260	.7	1.1
Huron county.....	35,123	61	.4	1.1
Lapeer county.....	27,488	35	.1	1.4
Saginaw county.....	83,850	160	.8	1.0
Sanilac county.....	35,038	71	.3	.9
St. Clair county.....	55,374	41	.3	.5
Tuscola county.....	36,079	54	.1	.3
CENTRAL DIVISION.	316,220	481	1.5	.5
Barry county.....	22,471	22	0	.....
Clinton county.....	25,366	50	.2	.8
Easton county.....	31,449	47	.1	.3
Genesee county.....	42,360	63	.3	.7
Gratiot county.....	30,046	96	.3	1.0
Ingham county.....	42,505	24	0	.....
Ionia county.....	35,117	55	.1	.3
Livingston county.....	19,138	3	0	.....
Montcalm county.....	33,742	61	.1	.3
Shiawassee county.....	34,026	60	.4	1.2
SOUTHWESTERN DIVISION.	143,034	99	.7	.5
Allegan county.....	39,032	21	.1	.3
Berrien county.....	49,599	34	.3	.6
Cass county.....	20,505	10	0	.....
Van Buren county.....	33,898	34	.3	.9
SOUTHERN CENTRAL DIVISION.	322,749	174	4.3	1.3
Branch county.....	26,484	7	.2	.8
Calhoun county.....	52,026	54	.2	1.4
Hillsdale county.....	29,842	21	.3	1.0
Jackson county.....	47,581	27	3	6.3
Kalamazoo county.....	47,685	21	.3	.6
Lenawee county.....	48,862	9	.1	.2
St. Joseph county.....	23,703	11	.2	.8
Washtenaw county.....	46,566	24	0	.....
SOUTHEASTERN DIVISION.	478,801	306	3.4	.7
Macomb county.....	33,110	33	.3	.9
Monroe county.....	33,157	30	0	.....
Oakland county.....	45,236	30	.1	.2
Wayne county.....	367,298	213	3	.8

THE PREVALENCE OF SMALLPOX IN URBAN AND RURAL LOCALITIES, IN MICHIGAN, IN 1906.

By Table 76, it may be seen that, in 1906, a much greater proportion of urban than rural localities were infected with smallpox. It may also be seen that the case rate (number of cases per 100,000 inhabitants) was very much higher in the rural than in the urban localities, indicating that the disease was most prevalent in the rural localities. The death rate in the rural localities was considerably less than that in the urban localities, but, by reason of the very small number of deaths, this cannot be taken as an indication of the prevalence of the disease in the two classes of localities.

The localities which, in 1906, had a much greater number of cases

than the case rate for the State as a whole (48.0 cases per 100,000 of the population) are as follows:

ALCONA COUNTY—Haynes township; ALGER COUNTY—Mathias township; ARENAC COUNTY—Deep River township; BARAGA COUNTY—Baraga village; BARRY COUNTY—Prairieville township and Thornapple township; BAY COUNTY—Bangor township, Beaver township, Frankenlust township, Gibson township, Hampton township, Kawkawlin township, Merritt township, Monitor township, Mt. Forest township, Pinconning township, Portsmouth township, Pinconning village and Bay City; BERRIEN COUNTY—Lincoln township; CALHOUN COUNTY—Athens township, Newton township and Homer village; CASS COUNTY—Silver Creek township, Wayne township and Dowagiac city; CHEBOYGAN COUNTY—Burt township and Grant township; CLINTON COUNTY—Dallas township and Victor township; DELTA COUNTY—Bark River township, Escanaba township, Escanaba city and Gladstone city; DICKINSON COUNTY—Felch township and Norway city; EATON COUNTY—Walton township, Charlotte city and Eaton Rapids city; EMMET COUNTY—Cross Village township; GENESEE COUNTY—Atlas township, Clayton township, Genesee township, Grand Blanc township, Mt. Morris township, Mundy township, Richfield township, Thetford township and Vienna township; GLADWIN COUNTY—Beaverton township, Clement township, Gladwin township, Grout township, Sage township, Beaverton township and Gladwin city; GOGEBIC COUNTY—Bessemer city; GRATIOT COUNTY—Bethany township, North Shade township, Pine River township, Summer township and St. Louis city; HURON COUNTY—Oliver township and Sebewaing village; INGHAM COUNTY—Lansing city; IONIA COUNTY—Keene township and Pewamo village; IOSCO COUNTY—Alabaster township and Oscoda village; ISABELLA COUNTY—Coe township, Coldwater township, Deerfield township, Gilmore township, Isabella township, Nottawa township, Shepherd village and Mt. Pleasant city; KALAMAZOO COUNTY—Vicksburg village; KENT COUNTY—Vergennes township and Lowell village; LAPEER COUNTY—Attica township, Dryden township, Hadley township, Imlay township, Almont village, Imlay City village and North Branch village; MARQUETTE COUNTY—Humboldt township; MECOSTA COUNTY—Wheatland township; MENOMINEE COUNTY—Cedarville township, Harris township and Nadeau township; MIDLAND COUNTY—Homer township, Larkin township, Midland township and Porter township; MISSAUKEE COUNTY—Bloomfield township, Caldwell township and Norwich township; MONTCALM COUNTY—Sidney township, Carson City village and Greenville city; MUSKEGON COUNTY—Fruitport township; NEWAYGO COUNTY—Sheridan township; OAKLAND COUNTY—Brandon township, Independence township, Pontiac township, Springfield township, Waterford township, West Bloomfield township, White Lake township, Clarkston village, Holly village, Orion village and Pontiac city; OGEMAW COUNTY—Edwards township, Horton township, West Branch township and West Branch village; ONTOXAGON COUNTY—Greenland township; PRESQUE ISLE COUNTY—Case township; ROSCOMMON COUNTY—Roscommon village; SAGINAW COUNTY—Albee township, Chapin township, Frankenmuth township and Tittabawassee township; SANILAC COUNTY—Custer township, Wheatland township and Sandusky city; SCHOOLCRAFT COUNTY—Manistique city; SHIAWASSEE

COUNTY—Sciota township, Shiawassee township, Venice township, Woodhull township, Bancroft village and Durand village; ST. CLAIR COUNTY—Brockway township, Clyde township, Kimball township and St. Clair city; ST. JOSEPH COUNTY—Colon village, Sturgis city and Three Rivers city; TUSCOLA COUNTY—Gilford township and Reese village; VAN BUREN COUNTY—Hamilton township, Keeler township and Paw Paw township; WAYNE COUNTY—Grosse Pointe village and River Rouge village; WEXFORD COUNTY—Cedar Creek township, Clam Lake township and Manton village.

TABLE 76.—*The prevalence of smallpox in urban and rural localities, in Michigan, in 1906.*

Localities—grouped according to density of population.	Estimated population.	Health jurisdictions.			Cases.	Deaths.	Death rates per 100,000 of the population.
		Total.	Infected.				
			Number.	Per cent of all jurisdictions.			
Cities over 50,000.....	440,984	2	2	100	52	0	.....
Cities from 25,000 to 50,000.....	147,162	4	3	75	57	1	.7
Cities from 10,000 to 25,000 and Calumet township (17,885).....	261,286	18	7	39	64	0	.....
Cities and villages from 5,000 to 10,000*.....	153,187	24	5	21	13	0	.....
Cities and villages under 5,000†.....	369,743	337	40	12	286	0	.....
Total urban.....	1,372,362	385	57	15	472	1	.07
Balance of localities—principally townships†....	1,212,171	1,254	116	9	768	2	.2

\* Exclusive of thirty-two villages in the two groups, for which the population in 1906 cannot be correctly estimated.

† Includes the thirty-two villages mentioned in the preceding paragraph, but does not include Calumet township, which, for the purpose of this study, is included in the third group of urban localities, which have corresponding populations.

#### THE REPORTED SOURCES OF CONTAGIUM IN SMALLPOX.

Table 77 indicates that in but twenty-seven per cent of the outbreaks of smallpox which occurred in 1906 was the source of the contagium traced and reported to this Department. It may be seen that seventy-two per cent of the outbreaks in which the source was traced were due to the movement, from one locality to another, of persons suffering from or who had been exposed to smallpox. In very many instances, the disease was so mild that the patients did not call in a physician, or take to their beds, and, in this way, many of them were enabled to move about from place to place without let or hindrance on the part of the local health officials.

The places from which and to which smallpox was spread in 1906 are shown in Table 78.

From among the reported methods by which smallpox was spread in 1906, the following are selected as representative:

Sixteen cases of smallpox, in seven households, in Carson City village, Montcalm county, were reported as due to a previous outbreak of what was supposed to be chicken-pox, and which the health officer supposed had subsided sometime before, the knowledge of the continuation of the disease having been kept from him.

Fourteen cases of smallpox, in four households, in Homer township, Midland county, were said to be due to the diagnosis of an eruptive disease in one family as chicken-pox, and it was not until after a consultation of physicians that the true character of the disease was recognized.

An outbreak of smallpox in Dowagiac City was said to be due to a letter received from a person in Berrien county who stated that she was suffering from the "Itch." Several persons in the family where the letter was received were taken sick with smallpox, the disease having been so pronounced by two physicians.

Another interesting instance of the spreading of smallpox through the mail may be found in the report of Dr. T. M. Koon, on a subsequent page of this article on smallpox.

TABLE 77.—*The reported sources of contagium in smallpox in Michigan, in 1906, as indicated by the number and per cent of instances in which each of the given sources was responsible for the introduction of the disease into a household.*

Sources.	Number of instances.	Per cent of all instances in which a source was given.
Outside jurisdictions.....	100	72
Traced to former cases in same jurisdiction.....	36	26
Through the mail.....	3	2
Not stated, or statements doubtful.....	380	* 73

\* Per cent of all households in which smallpox occurred.

TABLE 78.—Localities from which and to which smallpox was spread, during the year 1906.

Spread from:	To:	Spread from:	To:
Alcona County, Harrisville Village.	Wayne County, Detroit City.	Cass County, Dowagiac City.	Wayne County, Detroit City.
Bay County, Bay City.	Bay County, Frankenlust Township.	Cass County, Wayne Township.	Van Buren County, Hamilton Township.
Bay County, Bay City.	Bay County, Portsmouth Township.	Cheboygan County, Cheboygan City.	Cheboygan County, Grant Township.
Bay County, Bay City.	Iosco County, Alabaster Township.	Clare County, Grant Township.	Roscommon County, Roscommon Village.
Bay County, Bay City.	Newaygo County, Sheridan Township.	Delta County, Escanaba City.	Delta County, Bark River Township.
Bay County, Bay City.	Ogemaw County, West Branch City.	Genesee County, Flint City.	Iosco County, Oscoda Village.
Bay County, Bay City.	Saginaw County, Saginaw City.	Genesee County, Flint City.	Isabella County, Isabella Township.
Bay County, Bay City.	Wayne County, Detroit City.	Genesee County, Flint City.	St. Joseph County, Three Rivers City.
Bay County, Bay City.	Wayne County, River Rouge Village.	Genesee County, Grand Blanc Township.	Genesee County, Atlas Township.
Bay County, Beaver Township.	Gladwin County, Sage Township.	Genesee County, Grand Blanc Township.	Genesee County, Mundy Township.
Bay County, Monitor Township.	Saginaw County, Frankenmuth Township.	Genesee County, Mt. Morris Township.	Genesee County, Genesee Township.
Bay County, Monitor Township.	Saginaw County, Tittabawassee Township.	Gratiot County, St. Louis City.	Isabella County, Coe Township.
Bay County, Pinconning Village.	Bay County, Pinconning Township.	Gratiot County, St. Louis City.	Midland County, Porter Township.
Bay County, Portsmouth Township.	Bay County, Merritt Township.	Ingham County, Lansing City.	Isabella County, Mt. Pleasant City.
Perrien County, Watervliet Village.	Cass County, Dowagiac City.	Ingham County, Lansing City.	Shjawassee County, Durand Village.
Calhoun County, Marshall City.	Washtenaw County, Ann Arbor City.	Isabella County, Nottawa Township.	Isabella County, Gilmore Township.



TABLE 78.—CONTINUED.

Spread from:	To:	Spread from:	To:
Isabella County, Nottawa Township.	Isabella County, Isabella Township.	Oakland County, Pontiac City.	St. Clair County, Brockway Township.
Isabella County, Nottawa Township.	Isabella County, Mt. Pleasant City.	Oakland County, Springfield Township.	Montcalm County, Carson City Village.
Kalamazoo County, Kalamazoo City.	Isabella County, Shepherd Village.	Ogemaw County, West Branch City.	Bay County, Gibson Township.
Kalamazoo County, Vicksburg Village.	St. Joseph County, Colon Village.	Rosecommon County, Denton Township.	Ionia County, Keene Township.
Kent County, Lowell Village.	Kent County, Vergennes Township.	Saginaw County, Buena Vista Township.	Bay County, Merritt Township.
Lapeer County, Imlay City Village.	Lapeer County, Attica Township.	Saginaw County, (Locality not given).	Bay County, Bay City.
Lapeer County, Imlay City Village.	Lapeer County, Dryden Township.	Saginaw County, Saginaw City.	Midland County, Larkin Township.
Midland County, Jerome Township.	Midland County, Midland Township.	St. Clair County, (Locality not given).	Sanilac County, Marion Township.
Midland County, Porter Township.	Gratiot County, St. Louis City.	St. Joseph County, Sturgis City.	Branch County, Coldwater City.
Missaukee County, Norwich Township.	Missaukee County, Bloomfield Township.	Sanilac County, Custer Township.	Sanilac County, Sandusky City.
Montmorency County, Albert Township.	Bay County, Beaver Township.	Sanilac County, Custer Township.	Sanilac County, Wheatland Township.
Oakland County, Holly Village.	Genesee County, Vienna Township.	Sanilac County, (Locality not given).	Cheboygan County, Burt Township.
Oakland County, (Locality not given).	Wayne County, Detroit City.	Van Buren County, Hamilton Township.	Van Buren County, Keeler Township.
Oakland County, Oxford Village.	Lapeer County, Imlay Township.	Washtenaw County, Ann Arbor City.	Oakland County, Holly Village.
Oakland County, Pontiac City.	Oakland County, Orion Village.	Wayne County, Detroit City.	Oakland County, Holly Village.
Oakland County, Pontiac City.	Oakland County, Springfield Township.	Wayne County, Detroit City.	Grand Traverse County, Traverse City.

TABLE 78.—CONCLUDED.

Spread from:	To:	Spread from:	To:
Wexford County, Cadillac City.	Kent County, Grand Rapids City.	Minnesota, Duluth.	Calhoun County, Homer Village.
FROM OUTSIDE THE STATE TO LOCALITIES IN MICHIGAN.		Minnesota, (Locality not given).	Aleona County, Haynes Township.
Spread from:	To:	Minnesota, (Locality not given).	St. Clair County, Kimball Township.
Canada, Essex Center.	Wayne County, Detroit City.	Missouri, (Locality not given).	Kent County, Grand Rapids City.
Canada, Fargo.	Wayne County, Detroit City.	Ohio, Cleveland.	Wayne County, Detroit City.
Illinois, Chicago.	Schoolcraft County, Manistique City.	Wisconsin, De Pere.	Kalamazoo County, Vicksburg Village.
Indiana, Elkhart.	St. Joseph County, Sturgis City.	Wisconsin, Niagara.	Dickinson County, Norway City.
Indiana, Michigan City.	Muskegon County, Muskegon City.	Wisconsin, Seymour.	Gogebie County, Bessemer City.

## RESTRICTIVE AND PREVENTIVE MEASURES IN SMALLPOX.

*Placarding, isolation and disinfection.*—Table 79 indicates that, in but fifty per cent of all households in which smallpox occurred in 1906 were the restrictive measures of placarding, isolation and disinfection enforced. This may be partly accounted for by the fact that, in many instances, owing to the mild character of the disease, the health officer was not satisfied as to the true character of the disease, or was not notified in time to institute these restrictive measures, particularly those of placarding and isolation. In nearly every outbreak investigated by this Department since the present mild type of smallpox became widespread, in which the nature of the disease was in doubt, the disease has proved to be smallpox; and very many cases of smallpox might have been prevented in each year if the health officers had adopted the policy of giving the public the benefit of the doubt by the prompt institution of restrictive measures.

*Vaccination of sick persons.*—Table 79 indicates that sixty-one, and possibly eighty-one, per cent of all the persons sick from smallpox in 1906 had not been vaccinated, and emphasizes the well known and universally accepted fact of the immunity conferred by vaccination. This section of Table 79 may well be studied in connection with Table 79a, in which is shown the periods of time which elapsed between vaccination and sickness from smallpox, in certain instances, in the years 1904-1906.

*Disposition of exposed persons.*—It is gratifying to note that, notwithstanding the difficulty experienced by many health officers in restricting smallpox, in recent years, a large number of exposed persons were either vaccinated or isolated for a sufficient length of time, as may be seen by Tables 79 and 79b. There is a growing disposition on the part of health officials in some other states to dispense with the isolation of persons who have been exposed to smallpox, the principal objects being the saving to localities of large sums of money, previously expended in maintaining such isolation, and the inducement of the people, generally, to submit to vaccination for their own protection. The Michigan law requires the health officer to order the prompt vaccination or isolation of persons who have been exposed to smallpox, and it is believed that, as a rule, health officers are doing their best to comply with the law in this respect. The apparently large number of instances in which no statement was made relative to the disposition of exposed persons in 1906, may be partly due to the fact that, in many instances, the exposure had taken place some considerable time previously, and the danger from this source passed before the health officer had learned of the same.

*General and free vaccination.*—The lack of proper recognition, on the part of many people, of the necessity for vaccination, particularly during the presence of smallpox in a locality, may be seen by reference to Table 79, in which it is shown that, in 1906, notwithstanding that general vaccination was recommended in fifty-eight per cent, and free vaccination offered in thirty-nine per cent, of the infected localities in that year, general vaccination was observed in but twenty per cent of such localities.

A very commendable method of educating the people as to their duty in outbreaks of smallpox, with special reference to vaccination, is shown in the following circular, prepared and distributed by the health officer of North Branch village, Lapeer county:

#### **IMPORTANT NOTICE.**

Owing to the recent outbreak of smallpox in the village, many persons are concerned as to the best means to prevent the taking and spreading of the difficulty.

The first duty is that of the householder.

For the most effective restriction of all communicable diseases, one of the first requisites is that the health officer shall promptly receive notice of any case of dangerous communicable disease in the community in order that immediate steps may be taken for restricting and suppressing such disease. The law makes it the duty of every supervisor to prosecute for all failures to report cases of contagious sickness in the township.

The second duty is that of the quarantined person or persons.

Following is from the laws on public health:

Sec. 4473. That no person affected with smallpox, diphtheria or scarlet fever, shall wilfully enter a public place or a public conveyance, nor shall in any way wilfully subject another person to danger of contracting such disease; no person shall knowingly and wilfully take, aid

in taking, or cause to be taken, a child or other irresponsible person, while affected with any of the aforesaid diseases, into a public place or public conveyance, nor in any way knowingly and wilfully subject another person to danger of contracting any one of the aforesaid diseases from such child or irresponsible person; no person shall knowingly and wilfully subject another person to danger of contracting any of the aforesaid diseases from the body of a person deceased therefrom; no person shall in any way knowingly and wilfully expose, aid in exposing or cause to be exposed a child or other irresponsible person, to danger of contracting any one of the aforesaid diseases.

Sec. 4474. Whoever shall violate any of the provisions of section one of this act shall be deemed guilty of a misdemeanor, and on conviction thereof, shall be punished by a fine of not less than twenty-five dollars, nor more than one hundred dollars, or by imprisonment in the county jail not less than twenty days, nor more than ninety days.

Any person disregarding the condition of quarantine by going in and out of a house placarded for a contagious disease will be regarded as a person exposed, and will likewise be quarantined until such time as the danger of contracting the disease is over.

Communication with inmates of a quarantined house by any person will not be tolerated.

It is desired by the local Board of Health that a rigid quarantine be enforced, and if such conditions are disregarded more active measures will be enforced to insure safety of the public.

It is well known that smallpox can be prevented and modified by vaccination, and the proper preventative of an epidemic is general vaccination and revaccination of all persons not so protected.

The State Board of Health recommends that every local Board of Health in Michigan should, whenever smallpox is threatened, publicly recommend general vaccination and re-vaccination of all persons not successfully vaccinated within five years.

Everybody for their own interests, and that they may not become a breeding place for the distribution of smallpox to others, should seek protection which is afforded by vaccination alone.

The foregoing applies to all other contagious diseases.

*By Order of Board of Health.*

DR. J. O. THOMAS,

Health Officer, Village of North Branch.

*Results of restrictive measures.*—Table 80 and accompanying diagram are somewhat similar to tables and diagrams, relative to the results of restrictive measures in smallpox, in the annual reports of this Department ending with 1904, the principal difference being that the disease is now studied by *households* instead of *outbreaks*. It is believed that, with the continuation of the table for a number of years, a much better, and certainly a much more reliable, showing can be made than in the preceding reports.

TABLE 79.—*Restrictive and preventive measures in smallpox, in Michigan, in 1906.*

Restrictive and preventive measures.	Number.	Per cent of all cases, households, or localities.
<b>PLACARDING, ISOLATION AND DISINFECTION:</b>		
Households in which enforced.....	261	50
Neglected.....	69	13
Not stated, or statements doubtful.....	189	37
<b>VACCINATION OF SICK PERSONS:</b>		
Cases vaccinated at commencement of or prior to sickness*.....	230	19
Not vaccinated.....	761	61
Not stated, or statements doubtful.....	249	20
<b>DISPOSITION OF EXPOSED PERSONS:</b>		
Households in which they were vaccinated.....	224	43
Not vaccinated.....	167	32
Not stated, or statements doubtful.....	128	25
Households in which unvaccinated persons were isolated†.....	156	30
Not isolated.....	50	10
Not stated, or statements doubtful.....	313	60
<b>GENERAL VACCINATION:</b>		
Localities in which recommended.....	101	58
Not recommended.....	62	36
Not stated, or statements doubtful.....	10	6
Localities in which adopted.....	35	20
Not adopted.....	123	71
Not stated, or statements doubtful.....	15	9
<b>FREE VACCINATION:</b>		
Localities in which offered.....	68	39
Not offered.....	92	53
Not stated, or statements doubtful.....	13	8

\* The time of vaccination of sick persons in 1904-1906 is shown in Table 79a.

† The periods of isolation of exposed persons 1904-1906 is shown in Table 79b.

TABLE 79a.—*The time which elapsed between previous vaccination and the beginning of sickness in smallpox patients, in Michigan, in the three years, 1904-1906.\**

Time.....	Same day.	1 day.	3 days.	5 days.	7 days.	10 days.	21 days.	1 mo.	2 mos.	1 year.	2 yrs.
Number of cases.....	29	6	9	8	6	2	2	1	1	14	109
Time.....	3 yrs.	4 yrs.	5 yrs.	6 yrs.	7 yrs.	8 yrs.	9 yrs.	10 yrs.	12 yrs.	15 yrs.	16 yrs.
Number of cases.....	41	33	24	7	4	3	3	9	2	5	2
Time.....	20 yrs.	21 yrs.	24 yrs.	25 yrs.	30 yrs.	31 yrs.	35 yrs.	40 yrs.	45 yrs.	50 yrs.	53 yrs.
Number of cases.....	37	2	1	5	7	1	2	5	1	3	1
Time.....	55 yrs.	60 yrs.	1-2 yrs.	1-10 yrs.	2-10 yrs.	2-40 yrs.	3-4 yrs.	3-13 yrs.	3-20 yrs.	3-45 yrs.	5-25 yrs.
Number of cases.....	1	2	1	1	5	24	1	4	8	3	1
Time.....	6-8 yrs.	7-8 yrs.	8-15 yrs.	10-12 yrs.	10-15 yrs.	12-14 yrs.	15-20 yrs.	20-25 yrs.	20-30 yrs.	30-40 yrs.	
Number of cases.....	1	2	1	9	8	3	1	2	1	1	

\* There were 356 cases, not included in this Table, which had been vaccinated prior to the sickness from smallpox; but in which the time of vaccination was indefinite or not stated.

TABLE 79b.—*The time during which unvaccinated persons, who were exposed to smallpox, in Michigan, in the three years, 1904-1906, were isolated.\**

Number of days isolated.....	2	5	6	7	8	9	10	11	12	13	14
Instances in each period of days.....	4	1	3	1	4	2	22	1	7	5	85
Number of days isolated.....	15	16	17	18	19	20	21	22	23	24	25
Instances in each period of days.....	36	107	17	23	3	34	79	7	6	8	7
Number of days isolated.....	26	27	28	29	30	31	32	33	34	35	36
Instances in each period of days.....	1	5	10	2	27	4	5	3	4	12	4
Number of days isolated.....	37	38	39	40	41	42	43	44	45	46	47
Instances in each period of days.....	2	4	3	6	1	10	3	2	3	1	1
Number of days isolated.....	49	50	55	56	60	68	73	90			
Instances in each period of days.....	1	1	1	2	1	1	1	1			

\* In 44 instances, not included in this Table, the number of days was not definitely stated, as 5-10; 9-12; 20-60, etc.

TABLE 80.—*Showing the total number of households in which smallpox was present during the year 1905, together with the total numbers of cases and deaths and the average number of cases in each household in which the restrictive measures were enforced or neglected.*

	Total number of households, 519.		Restrictive measures enforced in 261 households.		Restrictive measures neglected in 69 households.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals.....	1,240	3	590	2	185	0
Average number per household.....	2.39	*	2.26	*	2.68	0

\* The average deaths per household are too small to be considered.

SMALLPOX RESTRICTED  
BY ISOLATION AND DISINFECTION.

Average numbers of cases and deaths per household in households in which restrictive measures were neglected and in households in which restrictive measures were enforced during the year, 1906.				
	NEGLECTED		ENFORCED	
	Per Household Cases	Deaths	Per Household Cases	Deaths
3	2.68		2.26	
2				
1		.008		0

[Plate 1262.]

SPECIAL INVESTIGATION OF AN OUTBREAK OF SMALLPOX IN IMLAY CITY.

On May 24, 1906, upon request from this office, Dr. Aaron R. Wheeler, of St. Louis, member of the State Board of Health, went to Imlay City to investigate an outbreak of smallpox, and found a number of cases of the usual mild type and also the usual difference of opinion



among physicians and laymen relative to the nature of the disease and to the necessity for placing restrictions upon the movements of persons suffering from a suspicious eruptive disease.

SPECIAL INVESTIGATION OF AN OUTBREAK OF SMALLPOX IN GREENVILLE.

On May 26, upon request of Dr. Malcolm C. Sinclair, Vice-President of the State Board of Health, Dr. T. M. Koon, of Grand Rapids, went to Greenville to make a special investigation of an outbreak of smallpox in that city, and those portions of his report of public interest follow:

"I found nine cases of smallpox existing in six different houses and one case in the smallpox hospital, which can properly be called a 'Pest House' in this instance. It seems that the first case occurred in the factory owned by Mr. Wright. The outbreak occurred in the latter part of April. A person in the South wrote a letter to Mr. Wright's factory along in April, stating that he had been under quarantine for smallpox and in about two weeks the employe who opened this letter was attacked with the disease. The employes of the factory were not vaccinated at this time and all of the additional cases are directly traceable to this factory."

\* \* \* \* \*

"I looked over the situation thoroughly at Greenville, going to all of the houses and pest house and before coming away I went over the situation with the Mayor and Health Officer and made the following recommendations:

"1st. That a day and night guard be placed over all premises where smallpox exists.

"2nd. That bulletins be published in the papers, warning people to get vaccinated.

"3rd. That the Board of Health vaccinate all school children and all of the employes in Mr. Wright's factory, and that they also urge all employers to get their men vaccinated.

"4th. That a circular letter be sent to all physicians, requesting them to report all cases promptly."

SPECIAL INVESTIGATION RELATIVE TO AN OUTBREAK OF SMALLPOX IN THE VILLAGE OF LOWELL.

On June 21, 1906, Secretary Shumway was called to make investigation relative to the continuance of smallpox in the village of Lowell. There were about forty-six cases then present and seventeen places under quarantine. There was no pest house or detention hospital, and the village was practically dead from a business standpoint. A mass meeting was called, and the necessity for hospital accommodation and the co-operation of the people, particularly of physicians, was pointed out. Some of the physicians were opposed to any action for the restriction of the disease, but the local board of health and the mayor and common council were all active in following the suggestions made, and the disease was practically under control within the next six weeks.

### CHICKEN-POX (VARICELLA) IN MICHIGAN IN 1906.

During the year ending December 31, 1906, there were reported to this Department seventy-one cases of chicken-pox (varicella), in thirty-two localities, in the State.

No fatal cases were reported, a circumstance which, prior to 1905, had not occurred in any previous year since 1901. From 1902 to 1904, inclusive, deaths, ranging from one to five, were reported annually.

So far as known, isolation and disinfection were properly enforced in none of the outbreaks in 1906.

Whenever an outbreak occurs in the State, the following letter is sent to the health officer of that jurisdiction:

"I am informed that chicken-pox is present in your jurisdiction.

"Many times smallpox has been diagnosed as chicken-pox, and not infrequently physicians have insisted that cases of smallpox were chicken-pox. There has long been trouble of this kind, but the mildness of smallpox recently has made this error more common than formerly.

"By this mail I send you copies of the pamphlet issued by this Board, 'Vaccination and Revaccination,—The Prevention of Smallpox,' and because smallpox is so often diagnosed as chicken-pox, all persons exposed to such a disease should be vaccinated; it is a reasonable precaution, and the public health interests should be given the benefit of every doubt.

"Children having chicken-pox should not be allowed to attend school; they should be promptly isolated until it is proved beyond a doubt that it is not smallpox.

"It should be remembered that adults seldom have chicken-pox, therefore an eruption, especially a papular eruption, becoming vesicular, occurring in a person over ten or twelve years of age, should be regarded as probable smallpox, and the same precautions should be taken as in cases of recognized smallpox, until some competent authority has decided that it is not smallpox.

"This Board has not yet issued a printed leaflet relative to chicken-pox, but because of the above-mentioned reasons it is recommended that every case of chicken-pox be reported to the local health officer, and that prompt action be taken by him to restrict the disease, and to report the facts to the Secretary of the State Board of Health."

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### MUMPS (PAROTITIS) IN MICHIGAN IN 1906.

During the year 1906, only three outbreaks of mumps (parotitis) were reported from the same number of localities in this State. No deaths were reported from this disease.

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### ERYSIPELAS IN MICHIGAN IN 1906.

During the year 1906, reports were received relative to thirty-seven cases, including twenty-eight deaths, from erysipelas, in the State.

So far as could be learned, there was no connection between these cases and any of the cases of puerperal fever reported to this Department.

## PUERPERAL FEVER IN MICHIGAN IN 1906.

During the year 1906, thirty-three deaths from puerperal fever were reported, but this number must not be taken as including all the cases of puerperal fever which occurred in the State in that year, because the reports of this disease are very meager, and, as a rule, first information of cases of the disease are obtained from the deaths returned to the Secretary of State.

## ITCH (SCABIES) IN MICHIGAN IN 1906.

During the year 1906, outbreaks of itch were reported from thirteen localities and most of the cases were evidently contracted at school.

Many communications were received from health officers and from the school officials asking for information relative to their respective duties in regard to this disease, and the following may be taken as representative of the advice given by this Department:

"\* \* \* \* \* inasmuch as itch is a communicable disease, children having it should be excluded from the public schools, and this should be done by the school board and local board of health acting in harmony for the good of all concerned. \* \* \* \* \*

"\* \* \* \* \* in numerous instances during the past, outbreaks of the mild form of smallpox have at first been called scabies and not reported, and the disease has thus been allowed to spread, therefore this Department feels warranted in urging health officers to thoroughly investigate all eruptive diseases and be sure that it is not the mild form of smallpox."

## TETANUS (LOCK-JAW) IN MICHIGAN IN 1906.

During the year 1906, there were reported to this Department, from twenty-five localities in this State, thirty-five cases of tetanus, all of which terminated fatally.

Of the twenty-three cases in which a source of infection was reported, three cases were due to wounded knees; three cases were due to wounds from rusty nails; two cases were due to wounds from blank cartridges; and one case each resulted from the following causes:

Infection from umbilical cord; wound in limb by a stick; cut in finger by old corn cutter; gunshot wound; developed the eleventh day after birth; blood poisoning; injury to hand; compound fracture; toy pistol; finger wounded by board; from scratch in hand or from vaccination; kick on knee by a cow; scalp wound; run over by street car and dirt got in lacerated leg; scratch by pin.

In fourteen instances, the average period of incubation (from the time of the wound or injury until tetanus developed) was 7.6 days.

In twenty-six instances, the average duration of the sickness (from the time tetanus developed until death occurred) was 4.9 days.

The averages of the ages of all the cases were: for males, 19.9 years, and for females, 21 years.

In Part 1 of this annual report is printed a statement relative to the efforts put forth by this Department during the fiscal year 1907 for the prevention of tetanus.

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#### DYSENTERY IN MICHIGAN IN 1906.

During the year 1906, 193 deaths from dysentery were reported to this Department by the Secretary of State, but no information was received from the health officers of any of the localities in which the cases occurred relative to the probable sources of the disease.

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#### TRICHINOSIS IN MICHIGAN IN 1906.

In the early part of the year 1906, a severe outbreak of trichinosis occurred in Bay City, members of at least four families being affected and in one of which a death occurred from the disease. The outbreak was caused by eating summer sausage, made by the head of the household where the disease first broke out. A report was received from but one of the attending physicians, who stated that he had twelve patients in all under his care, and that all recovered. How many cases were under the care of other physicians is not known.

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#### DISEASES OF ANIMALS, DANGEROUS TO MAN, IN MICHIGAN IN 1906.

Whenever information is received at this office of the occurrence of an outbreak of any disease of animals, which, by reason of its communicability, may be considered dangerous to man, efforts are made to learn all facts relative to such outbreaks. The matter is reported to the State Live Stock Sanitary Commission, and the attention of the health officials of the locality where the disease is reported present is called to the fact of its reported prevalence, and they are requested to take immediate measures for the prevention of its spread, by establishing and maintaining quarantine over the diseased animals, until relieved by the State Live Stock Sanitary Commission.

During the year 1905, outbreaks of tuberculosis and actinomycosis (lumpy jaw) among cattle; glanders (farcy) in horses; and rabies (hydrophobia) in various animals, were reported to this office from various parts of the State, a brief history of the most important of which follows:

## ANTHRAX IN MICHIGAN IN 1906.

In July, 1906, the health officer of Richland township, Ogemaw county, reported two persons suffering from anthrax, the first case occurring in a man who cared for sheep and handled wool, and the second, in the physician who attended the first case. The first person taken sick died but the second one recovered.

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## GLANDERS (FARCY) IN HORSES IN MICHIGAN IN 1906.

During the year 1906, two outbreaks of glanders, in horses, were reported from the same number of localities in the State.

The following is a sample of the advice given by this Department upon the receipt of information relative to an outbreak of glanders:

"Relative to glanders, the case should at once be reported to the State Live Stock Sanitary Commission, and the health officer of the jurisdiction in which the case occurs is expected to take charge of the case until some member of the commission relieves him. Meanwhile it is very important, since the disease is dangerous to man and to animals, to isolate the animal supposed to be diseased, and to take every precaution until the commission or some member thereof shall relieve the local board of health of the charge."

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## RABIES (HYDROPHOBIA) IN MICHIGAN IN 1906.

During the year 1906, there were reported to this office two cases of rabies in the same number of localities in this State. One of the cases was that of a man in Carlton township, Barry county, who died from the disease. The second case was that of a cow which was bitten by a mad dog and developed rabies. The cow was killed and the barn fumigated.

The following general instructions have been sent to health officers, and other interested persons, in localities where rabies was reported present:

### MUZZLE ALL DOGS AT LARGE.

The State Board of Health advises every local board of health in Michigan to immediately make and publish regulations ordering the muzzling of all dogs at large and the killing of all unmuzzled dogs found at large, and to make provision for the prompt and effective execution of such regulations.

Local boards of health have full power to make such regulations which, when published, have the force of law, the violation of which is a misdemeanor. This power or authority is implied, and is also given by statute in Michigan, in townships by Sections 4412 and 4413, Compiled Laws of Michigan, 1897; and these sections are made to apply in cities and villages by Sec. 4459, excepting in cases where the charters of such cities and villages contain provisions inconsistent therewith.

The section of law specifying the manner of the publication is as follows:

"Sec. 4416. Notice shall be given by the board of health of all regulations made

by them, by publishing the same in some newspaper of the township, if there be one published therein, and if not, then by posting them up in five public places in such township; and such notice of said regulations shall be deemed legal notice to all persons."

The following form is recommended:

OFFICIAL PUBLIC NOTICE BY THE BOARD OF HEALTH. REGULATIONS FOR THE PREVENTION OF HYDROPHOBIA, BY THE RESTRICTION OF RABIES.

WHEREAS, Rabies is widely disseminated and is epidemic in Michigan; and

WHEREAS, The State Board of Health has recommended that municipal and township authorities order the muzzling of all dogs at large, and make and publish regulations to that effect;

*Resolved*, That the local board of health of the township [city or village] of ..... county of ....., State of Michigan, hereby makes and publishes the following regulation:

All dogs, male or female, not effectually muzzled, running at large on any street, alley or public grounds, or private premises, not the premises of the owner or keeper thereof, may be killed by any person; and it shall be the duty of every constable [policeman, or other peace officer] of the said township [city, or village] and he is hereby ordered to kill any and all such dogs.

[Name of place and date.]

Attest.

.....  
Clerk of the Board of Health.

MAD DOGS.—WHAT TO DO WITH AN ANIMAL SUPPOSED TO BE RABID.

If it is certain that the supposed rabid animal has not bitten any person or animal, it may properly be killed and buried where no other animal may gain access to it.

Whenever a person has been bitten by a dog which there is reason to believe is infected with rabies, or a part of his body of which the skin is in any way broken is brought in contact with saliva from such dog, he or she should promptly go or be sent to a Pasteur Institute for treatment until it is determined whether or not the dog was so infected.

When an animal has been bitten by a dog supposed to be rabid (commonly said to be "mad" or to have "hydrophobia"), it is desirable, and when a person has been so bitten it is important that the fact be established whether or not the dog is rabid. Because, if it is known to be rabid, there may then be time for the person bitten to undergo preventive inoculation or other treatment; while if the dog is proved not to have had rabies such trouble may be prevented, as also the extremely painful anxiety which otherwise would long continue. It is now possible to learn whether or not an animal is rabid.

If practicable, without danger of some person being bitten, the dog or other animal supposed to have rabies should not be killed, but be very securely confined, in such manner that it is not possible for it to bite any person or animal. *If the dog is rabid it will die within eight days.* If it does not, it is proof that it was not rabid. If it dies, the animal was probably rabid, and in that event, as also if the animal has been killed, the upper portion of the spinal cord and adjacent part of brain should be placed in a sterilized bottle with a glass stopper, the bottle then filled with twenty per cent solution of pure glycerine, and the whole sent by express or special messenger to the Director of the State Laboratory of Hygiene, Ann Arbor, with request for an immediate biological test for rabies, and a report of the result. Such investigations are made there at cost.

A person bitten by an animal supposed to be rabid should very promptly consult a physician; and without waiting for the physician should employ all practicable means for dislodging from the wound any germs of virus which may have entered there; washing the wound freely with boiled water, and by means of a syringe if possible.

Rabies is a "disease dangerous to the public health" and as such should be

promptly reported to the health officer, and promptly restricted by him in accordance with Act 137, Laws of 1883, and other laws relating to the public health. If the disease occurs in an animal, the health officer or local board should also, in compliance with Sections 5 and 6, Act No. 125, Laws of 1889 (C. L. 1897, Sections 5631 and 5632), promptly report the fact to the State Live Stock Commission,—the guardians of the safety of animals; but under no circumstances should the local health authorities fail to guard the public health and life from this fearful disease.

Animals bitten by a supposed rabid dog should be promptly isolated by the local board of health and kept thus until the State Live Stock Commission shall have been informed of the facts and takes charge of the animal or animals, thereby relieving the local board of health. This is required by Section 6, Act 125, Laws of 1899 (Section 5632, C. L. 1897). Whether in man or animal, the disease should be promptly reported to the State Board of Health.

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## ALLEGED NUISANCES IN MICHIGAN IN 1906.

During the year 1906, communications relative to ninety-two alleged nuisances in Michigan were received at the office of the State Board of Health.

The causes to which the alleged nuisances mentioned in these communications were attributed, may be classified as follows:

Stagnant water, 13; slaughter houses, 12; privy vaults, 9; insanitary condition of streets, 6; refuse dumped on ground, 6; waste from sugar beet factories, creameries and pickle factory, 5; barnyard and manure heaps, 5; filthy pig pens, chicken coops, etc., 5; insanitary drains, 4; insufficiently buried animals, 4; pollution of ice, streams, etc., 4; water closets, 3; cesspools, 3; fertilizer, 3; open ditches, 2; sewers, 2; meat market, 1; spitting on sidewalk, 1; contaminated water, 1; decayed fruit in center of village, 1; horse kept in basement of house, 1; and nuisance from dead fish due to contamination of river water, a detailed account of which follows:

### POLLUTION OF GRAND RIVER BY THE OWOSSO SUGAR CO'S FACTORY.

On October 22, 1906, complaint was made to this office by the authorities of the city of Grand Ledge that large numbers of dead fish were accumulating in the bayou, just above the dam, at that place and that the condition was not only a nuisance but becoming a menace to health. Similar complaint was made by the residents along the river between Lansing and Grand Ledge. Suspicion pointed to the Sugar Factory, at Lansing, as the cause, as the condition in question did not exist prior to the opening of the factory for the season. In an effort to locate the cause, the Deputy Secretary of this Department, accompanied by the State Analyst, investigated the condition of the river at the point where the discharge from the factory empties into it. Samples of the liquid discharge from the factory were collected and analyses made of the same by the State Analyst, the results of which are contained in his report, printed below.

As the pollution of rivers or lakes, from which fish are taken, is an offense in this State under Section 5854, Compiled Laws of 1897, and the same being under the supervision of the State Fish and Game

Warden, this Department communicated the facts to that office. The Deputy Game Warden came upon the ground, looked the situation over carefully, and ordered the Owosso Sugar Co., to discontinue running its refuse into the river until it was put in a condition to be harmless to fish.

MICHIGAN  
DAIRY AND FOOD DEPARTMENT.  
LANSING.  
Copy.

October 27, 1906.

Hon. A. C. Bird, Commissioner, Lansing, Mich.

Dear Sir—At the request of Dr. Shumway of the State Board of Health, we have been conducting some experiments in attempting to ascertain the cause of the death of so many fish in Grand River during the last ten days. This matter was not called to our attention until the best evidence obtainable had passed away. A personal investigation of the conditions revealed the fact that the fish and other living animals in the water below the sewers of the sugar factory and extending as far west as Grand Ledge, were dying in enormous quantities. The bottom of the river for miles was lined with dead fish. From evidence which we were able to obtain by examination of conditions in the river and by an examination of samples of water taken from the river at Grand Ledge and the river above the factory, in the factory sewers and in the river below the factory, we arrived at the conclusion that the cause of death of so many fish was suffocation, or in other words that there was not sufficient air in the water. There were no ingredients in the water, so far as we were able to determine, which were toxic to the fish, but because of the fact that the air had been driven from the water and it had in turn become loaded with exhaled gases, the fish were unable to breathe.

Immediately following a heavy rain and concomitant with the opening of the sluices at the dam, whereby the volume of water going down the river was materially increased, the condition immediately disappeared. I am therefore forced to the opinion that the cause, as before stated, of the difficulty was the lack of air in the water, thus suffocating the fish, a condition caused to my mind by the discharge into the river from the sugar factory of water which in one sewer was heavily charged with  $\text{Co}_2$  gas and in another sewer was deprived of air by being previously heated.

I am conscious of the fact that no manufacturing establishment depending on water for its operation, can expect to make the water better than it was to begin with. There must be some outlet for its waste material and we have consequently, in attempting to work this matter out endeavored to if possible suggest a remedy. In the result we think we have attained, the remedy easily suggests itself. This remedy is that the water from the sewers of the sugar factory, before entering the river, should be thoroughly aerated. If this is done, to my mind, the difficulty will disappear. The factory chemist should be able, by having constant control of this waste-water, to determine at any and all times as to the effectiveness of the system of aeration which they will install.

I would call to your attention as an example of the efficiency of aeration, the dam at Grand Ledge. The river water passing over this dam became so thoroughly aerated that the conditions which existed above did not exist immediately below the dam.

Will you kindly take this matter up with the Secretary of the State Board of Health at your convenience.

I beg to remain,

Very truly yours,

FLOYD W. ROBISON,  
*State Analyst.*

Whenever complaint of an alleged nuisance is received at this office, the president of the local board of health whose duty it is to act, is



usually informed of the nature of the nuisance, and is requested to investigate the same. At the same time the sections of law, and pamphlet publications of this Board pertaining to nuisances and to the duties of local boards of health relative thereto, are sent to him and also to the person making complaint. Two regular forms of letters are used for this purpose. The first is sent to the person making complaint of the nuisance, the other is sent to the president of the board of health of the locality where the nuisance is reported to exist.

In articles on alleged nuisances, published in previous annual reports of this Board, attention was called to the fact that a large proportion of the communications received at this office in regard to alleged nuisances came from local health officers and other township, city and village officials asking for information relative to points of law concerning nuisances, or requesting advice as to their duties, or to the proper legal procedure necessary to effect the prevention or abatement of nuisances. The correspondence of 1906, shows a continued desire on the part of the local health officials for advice and cooperation of this Board, which has been freely and cheerfully given, and it is believed with results beneficial to the public health.

The State Board of Health has no authority to enforce or order the abatement of a nuisance. Its powers in this respect are advisory. And while the board is willing to render such advice as it may be able to give on any subject, it is often the case in regard to nuisances, that prosecuting attorneys or other lawyers on the ground and acquainted with the facts, are in better position to give legal advice than is the office of the State Board of Health. The Secretary of the State Board of Health is always glad to learn of the efforts of local boards to abate nuisances, and what success attends those efforts, and solicits correspondence upon this subject. However, the State Board of Health cannot undertake to do for local boards that which the law has so well provided for their doing for themselves. In showing them how they can help themselves it really does more for them than to do their work; for when the local board has mastered the situation and removed a nuisance, it has secured a vantage ground which a distant authority could not so well secure and hold.



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## APPENDIX.

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### MEASURES FOR THE RELIEF AND CURE OF TUBERCULOUS PERSONS, AND FOR THE PREVENTION OF THE SPREAD OF TUBERCULOSIS FROM SUCH PERSONS TO OTHERS, IN PUBLIC AND PRIVATE INSTITUTIONS IN MICHIGAN.

For the purpose of learning what is being done for the relief and cure of tuberculous persons, in Michigan, and for the prevention of the spread of tuberculosis from such persons to others under the same roof, not sick with the disease, in 1906, copies of the following letter and blank were mailed to the management of institutions for the treatment of disease, the care of the indigent, and the care and restraint of the criminal classes and of those of unsound mind, with the results shown in the summary on following pages:

STATE BOARD OF HEALTH.

MICHIGAN.

*Office of the Secretary, Lansing.*

July, 1906.

.....,  
....., Michigan.

DEAR SIR:

Prompted by frequent requests for information from the medical profession, sanitarians, and others making a special study of tuberculosis, this Department desires to ascertain what are the forces in our State directed against this disease. To do this, we need to get in touch with the work in the various institutions, both private and free, that undertake the cure or relief and protection of persons suffering from tuberculosis. It is desired to learn, if possible, the number of such institutions, the extent to which such treatment is practiced in each institution, and, in general, the methods exercised.

We most earnestly hope to learn at your hands the position taken by the institution of which you have charge, with respect to the care and treatment of tubercular sufferers. It is the belief of this Department that, in this way, much of extraordinary interest will be learned, and that the people of Michigan are, perhaps, doing more for the prevention of this dread disease than at the present time is known. We shall not be surprised to find that there is more widespread concern for these unfortunates than we have dared to hope.

In order that such information may be as explicit as possible, and to facilitate your aid in the matter, we have formulated a few questions, the majority of

which can be answered by "yes," or "no." We would very much prefer to receive full and complete answers to these questions, if you can see your way clear so to accommodate us.

Any courtesy you can extend the Department in regard to this subject will be very greatly appreciated.

Enclosing the accompanying questions, together with a stamped envelope for their return, and thanking you in advance for the service rendered, I am

Very truly yours,

FRANK W. SHUMWAY.

Secretary.

Name of Institution....., Michigan.

1. Does the institution of which you have charge *exclude* persons suffering from tuberculosis? .....

2. Do you receive only *casual* tuberculous subjects? .....

3. Do you make a *specialty* of caring for tubercular patients? .....

4. Do you receive *all* classes of tubercular patients, that is, the incipient class, the incurables, and the middle stages or "walking class"? .....

5. Which of the above classes do you receive and treat?.....

6. Have you a special ward used *only* by tubercular patients?.....

7. Please state the precautions which you require each tubercular patient to observe .....

8. Do you permit any tuberculous person in the general ward? .....

9. If your tubercular patients mingle or associate with other inmates of your institution, what precautions are required that the other inmates may be protected from the disease? .....

10. Have you special methods and means of treating tuberculous persons? .....

If so, please state what they are.....

11. State approximate number of cases of tuberculosis treated each year.....

12. What percentage of cases treated are benefited? .....

13. What percentage of cases treated are cured? .....

14. What plan of treatment is followed? .....

[Signature.]



SUMMARY RELATIVE TO REPORTED MEASURES FOR THE RELIEF AND  
CURE OF TUBERCULOUS PERSONS, AND FOR THE PREVENTION  
OF THE SPREAD OF TUBERCULOSIS FROM SUCH PERSONS  
TO OTHERS, IN PUBLIC AND PRIVATE INSTITU-  
TIONS IN MICHIGAN.

Number of letters of inquiry sent out:			
To Hospitals, sanatoriums, medical and surgical homes....	123		
State institutions .....	16		
To county homes .....	73	Total =	212
Number of institutions making reports:			
Hospitals and kindred institutions .....	73		
State institutions .....	13		
County homes .....	50	Total =	136
Number of institutions which <i>exclude</i> persons suffering from tuberculosis:			
Hospitals and kindred institutions.....	46		
State institutions .....	4		
County homes .....	12	Total =	62
Number of institutions which <i>receive all classes</i> of tuberculous persons:			
Hospitals and kindred institutions.....	11		
State institutions .....	9		
County homes .....	30	Total =	50
Number of institutions which <i>receive only the incipient class</i> of patients:			
Hospitals and kindred institutions .....	9		
County homes .....	1	Total =	10
Number of institutions which <i>receive only the "walking" class</i> of patients:			
Hospitals and kindred institutions.....	3		
County homes .....	2	Total =	5
Number of institutions which <i>receive only the incurable class</i> of patients:			
Hospitals and kindred institutions .....	2		
County homes .....	2	Total =	4
Institutions which <i>make a specialty</i> of caring for tuberculous persons:			
Northern Michigan Asylum.			
Kalamazoo County Home.			
Wayne County Home.		Total =	3
Number of institutions which <i>have a special ward, private rooms, or tents</i> , for tuberculous patients:			
Hospitals and kindred institutions.....	14		
State institutions .....	5		
County homes .....	14	Total =	33
Number of institutions which have <i>special methods or means</i> for treatment of tuberculous persons:			
Hospitals and kindred institutions .....	10		
State institutions .....	3		
County homes .....	3	Total =	16

Number of institutions which <i>give fresh air treatment</i> , either outdoors entirely, or in rooms with open windows or in which the windows have been taken out:			
Hospitals and kindred institutions .....	12		
State institutions .....	5		
County homes .....	7	Total =	24
Approximate number of <i>persons treated</i> annually:			
In hospitals and kindred institutions.....	519		
In State institutions .....	153		
In county homes .....	161	Total =	833
Average per cent of <i>persons benefited</i> by the treatment:			
In hospitals and kindred institutions.....	71	per cent	
In State institutions .....	30	" "	
In county homes .....	23	" "	
Average per cent of <i>persons cured</i> by the treatment:			
In hospitals and kindred institutions.....	17	per cent	
In State institutions .....	5	" "	
In county homes .....	2	" "	
Number of institutions which <i>observe some precautions</i> against the spread of tuberculosis from their tuberculous patients to others not sick with this disease:			
Hospitals and kindred institutions .....	31		
State institutions .....	11		
County homes .....	22	Total =	64
Number of institutions which <i>do not observe any precautions</i> against the spread of the disease, as referred to above:			
Hospitals and kindred institutions.....	1		
County homes .....	8	Total =	9
Number of institutions which, apparently, <i>observe only the isolation of the patient</i> :			
Hospitals and kindred institutions.....	5		
State institutions .....	1		
County homes .....	4	Total =	10
Number of institutions which, apparently, <i>observe only the care of the sputa</i> :			
Hospitals and kindred institutions.....	8		
State institutions .....	3		
County homes .....	6	Total =	17
Number of institutions which <i>observe both isolation and the care of the sputa</i> :			
Hospitals and kindred institutions.....	15		
State institutions .....	4		
County homes .....	9	Total =	28







